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SOME NEW GENERA AND SPECIES OF EPEOLINE AND NOMADINE BEES

(Hymenoptera, Nomadidæ)

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The following descriptions are offered in advance of a more comprehensive study, now in progress, of the genera of the bee family Nomadidæ.

Genus Epeolus Latreille

Epeolus Latreille, 1802, Hist. nat. Fourmis, p. 427.
Phileremus, Cresson (nec Latreille), 1887, Trans. Am. Ent. Soc., Suppl., pp. 132, 297 (pars).
Argyroselenis Robertson, 1903, Can. Ent., 35:284.

Since the time of Cresson, a group of Epeoline bees with two submarginal cells has been separated from *Epeolus*, usually under the name of *Phileremus*. The latter name was proposed by Latreille for a group of distantly related bees and has long been considered synomymous with *Ammobates* Latreille. Ducke (1908) has referred one of these species with two submarginal cells to *Epeolus* (*americanus* Cresson) and has been followed in this respect by Cockerell (1921, 1934). *Phileremus montanus* Cresson is very closely related to *P. americanus* and the two should have the same generic disposition. Both species agree with typical *Epeolus* in the form of the mandibles, maxillary palpi, and structure of the terminal abdominal segments, differing only in having lost the second transverse cubital vein in the anterior wing. The group typified by *Phileremus mesillæ* Cockerell, however, is not closely related to the above mentioned Cresson species. It differs in having the mandibles simple or with a feeble inner tooth at middle, rather than with a stout subapical tooth, the wings are hyaline instead of tinted with fuscous, and the abdominal bands are entire, unbroken at the middle, and attaining the lateral tergal margins. This group is confined to the desert areas of southwestern United States and

although it seems advisable for the time being to retain these in *Epeolus*, it may sometime be necessary to separate them subgenerically. In southern California, in addition to what appears to be typical *mesillæ*, there is a larger subspecies (7.5 — 8 mm. as compared with 5.5 — 6 mm.) which differs in having the abdominal bands less distinctly defined and the dark areas clouded with white pubescence. This form may be designated as **Epeolus mesillæ palmarum**, new subspecies. Holotype female (No. 4789, Calif. Acad. Sci., Ent.) and allotype male (No. 4790, Calif. Acad. Sci., Ent.), collected by the writer at Edom, Riverside County, California, March 28, 1937, at flowers of *Larrea glutinosa*. Paratypes from Palm Canyon, Edom, and Box Canyon, all in Riverside County, in the collections of Mr. P. H. Timberlake, Mr. C. D. Michener, and the writer.

Argyroselenis Robertson, based on *Triepeolus minimus* Rob., is merely an *Epeolus* with two free segments in the maxillary palpi.[1] In both *Epeolus* and *Triepeolus* the palpi may have either one or two free segments, although there are usually two in the latter and one in the former. The palpal characters are therefore insufficient to separate the two genera. The most fundamental difference between them is in the structure of the genitalia and form of the apical abdominal segments. In the female of *Epeolus* the fifth tergite bears a silvery pubescent band and the pseudopygidial area is undifferentiated, the pygidial field of the sixth tergite is narrowly rounded at the apex, and the sixth sternite terminates in two broadly curved processes. In *Triepeolus* the fifth tergite bears a flattened, bevelled, pseudopygidial area, the pygidial field of the sixth tergite is broadly rounded, and the sixth sternite terminates in two long, straight, slender processes armed at the apex with stout, diverging spines. *Epeolus* is a Holarctic group of northern origin, *Triepeolus* an American group, probably of southern origin.

Triepeolus mojavensis Linsley, new species

Female: Black, pubescence black, variegated with whitish on pronotum and mesoscutum and with bands of white on abdominal tergites. *Head* narrower than thorax; vertex sparsely pubescent,

[1] Cockerell (1921, Am. Mus. Nov., 23:2) has suggested that *Argyroselenis* may be the same as *Diepeolus* Gribodo, which has two free segments in the maxillary palpi. The type species of Gribodo's genus is unknown to me but the probabilities are that it should also be considered an *Epeolus*.

moderately coarsely, closely punctured, the surface becoming rugose near the eye margins; ocelli separated by nearly one ocellar diameter; frons coarsely, closely punctured, rather densely clothed with moderately long, erect, black hairs; cheeks moderately coarsely, closely punctured, not carinate; antennæ black, scape robust, less than three times as long as broad, pedicel moderately retracted within apex of scape, about one and one-half times as broad as long, first flagellar segment shorter than second; clypeus subglabrous, finely punctured basally, a little more coarsely, closely toward apex; labrum more coarsely and less regularly punctured than clypeus, apex feebly emarginate at middle; maxillary palpi composed of two free segments. *Thorax* robust; pronotum clothed along dorsal margin with prostrate, whitish hairs; mesoscutum moderately coarsely punctured, the punctures averaging a little less than one puncture width apart, becoming sparser on posterior disk, anterior and lateral margins clothed with prostrate, whitish hairs; tegulæ subglabrous, distinctly and only moderately finely punctured; axillæ triangular but not produced as a tooth or spine; mesoscutellum moderately biconvex, punctures similar to those of mesoscutum, varying from less than one to one puncture width apart, median line and lateral and posterior margins clothed with prostrate whitish hairs; mesepisterna coarsely, closely, subrugosely punctured, clothed with erect, black hairs which are replaced by white along dorsal margin; mesosternum similarly punctured, the hairs all black; metanotum more finely punctured than mesoscutellum, clothed with prostrate whitish hairs, a little longer and suberect at sides; propodeum with triangular area shining, very finely, closely punctured, subglabrous, sides of propodeum moderately densely clothed with long, whitish, prostrate and suberect hairs; wings lightly tinted with fuscous, marginal cell longer than distance from its apex to tip of wing, first submarginal cell along posterior margin, about as long as second and third together; legs black, clothed with short, black pubescence. *Abdomen* with tergites finely, closely punctured, dark areas clothed with prostrate, brownish black pubescence; first tergite with a broad, dense band of white pubescence at sides, narrowly separated on posterior margin, more widely and arcuately at middle where it leaves an oval dark area on disk; tergites two, three, and four with a broad, white band of hairs along apical margin; fifth tergite with a broad pseudopygidial area, defined primarily by coarse, erect and suberect, brown hairs; pygidial plate of sixth tergite broadly triangular, sides straight, apex broadly rounded; sternites black, finely, closely punctured, sparsely clothed with prostrate black pubescence; processes of sixth sternite slender, straight, apices spinose and clothed with long hairs. Length: 8-10 mm.

Holotype female (No. 4801, Calif. Acad. Sci., Ent.), and two paratypes, also female, collected by the writer at the junction of Deep Creek and the Mojave River, on the Mojave Desert near Hesperia, California. The specimens were flying about the nests of an undescribed species of *Anthophora*.

This remarkably anomalous species is intermediate in many of its characters between *Triepeolus* and *Epeolus*, but seems unquestionably to belong to the former genus. The maxillary palpi are composed of two free segments, the marginal cell is elongate, and the processes of the sixth sternite are slender, straight, and spinose at the apex, but the pygidial plate of the sixth tergite is broadly triangular with the apex broadly rounded. From all of the species of *Triepeolus* known to the writer, *mojavensis* differs in the absence of carinæ on the cheeks.

Protepeolus integer Linsley, new species

Male: Black, the antennæ, mouthparts, pronotal tubercles, tegulæ, scutellum, and legs entirely, or dominantly, reddish; pubescence mostly whitish, with small patches of brown. *Head* with vertex behind the ocelli shining, subglabrous, moderately coarsely punctured, the punctures varying from less than one to one puncture width apart; occiput clothed with long, erect, pale hairs; facial pubescence very dense, white, obscuring the surface, longer and suberect on clypeus; ocelli large, nearly touching, lateral ocelli separated from margin of compound eye by less than two ocellar diameters; antennæ with scape slender, pedicel longer than broad, distinctly longer than second flagellar segment, first segment of flagellum about as long as the three following together; mandibles piceous at apex, basal half of outer face densely fringed with long, white hairs; maxillary palpi short, ultimate segment robust. *Thorax* moderately stout; pronotal tubercles clothed with white pubescence; mesoscutum punctured similarly to, but a little more closely than, vertex, the punctures finer anteriorly; anterior and lateral margins and anterior half of median longitudinal impression clothed with whitish hairs; pubescence of remaining surface shorter, brownish; lateral face of mesepisterna margined with white pubescence, disk more coarsely punctured than mesoscutum, clothed with longer brownish hairs; mesocutellum biconvex, more coarsely punctured at middle, surface subglabrous except for median line and lateral margins; metanotum subglabrous, more finely punctured than mesocutellum; propodeum with sides shining, coarsely punctured, sparsely clothed with long, white hairs; triangular area sparsely clothed with shorter, suberect hairs; legs reddish, coxæ and trochanters piceous to black, sparsely

clothed with white pubescence; wings lightly infuscated, a dusky streak beyond marginal cell, marginal cell broadly rounded at apex. *Abdomen* without a deep constriction between first and second sternites; transverse bands of tergites entire, formed of dense, short, plumose, white hairs; first and second tergites with a finely punctured, shining band along apical margins which is sparsely clothed with brownish hairs; tergites three to seven very densely white pubescent, the pubescence of tergite seven and the base of tergite five so dense as to appear velvety and more or less cream colored; tergite seven without a pygidial plate; sternite five very densely clothed with short, velvety, somewhat ochreous pubescence. Length approximately 13 mm., anterior wing 6 mm.

Holotype: male (in collection of P. H. Timberlake), from Douglas, Arizona, August 18, 1935, collected by Mr. W. W. Jones.

This species differs from *P. singularis* Linsley and Michener, its only known congener, by the more coarsely punctured integument, the sparsely pubescent metanotum, propodeum, coxæ, and trochanters, and the entire pubescent bands of the abdominal tergites. Morphological differences, some of which are probably sexual, may be enumerated as follows:

Antennæ with first flagellar segment shorter than the following two together; anterior and lateral ocelli smaller, separated by about one ocellar diameter; maxillary palpi longer, ultimate segment slender; marginal cell obliquely truncate at apex; abdomen with a deep constriction between first and second sternites ..... *singularis*, ♀

Antennæ with first flagellar segment about as long as the following three together; anterior and lateral ocelli nearly touching; maxillary palpi shorter, ultimate segment robust; marginal cell broadly rounded at apex; abdomen without a deep constriction between first and second sternites..... *integer*, ♂

Hesperonomada Linsley, new genus

Integument finely punctured. *Head* nearly as wide as thorax; eyes attaining on vertex a line tangent to anterior margin of lateral ocelli, very narrowly separated from base of mandibles below, inner margins converging slightly on lower face; ocelli large, anterior ocellus separated from lateral ocelli by less than the diameter of a single ocellus, lateral ocelli separated from margin of eye by about four ocellar diameters; vertex rounded above, frontal suture distinct; antennæ short, scape robust, a little more than three times as long as broad, pedicel large, broader than long, flagellar segments longer than broad, the first shorter than

second; labrum broader than long, apex broadly rounded; mandibles simple, inner margin edentate; maxillary palpi distinctly shorter than first segment of labial palpi, composed of five free segments, the first about one and one-third times as long as second, remaining segments subequal in length. *Thorax* robust; mesoscutem convex, median impression distinct; axillæ rounded; scutellum more or less evenly convex, feebly bilobed; metanotum very transverse; mesepisterna short, vertical; anterior coxæ simple, not spined; legs short, anterior femora without a tooth; wings infuscated; marginal cell acute, apex not separated from costa, submarginal cells two, subequal in length, the second cell receiving the two recurrent veins at about an equal distance from base and apex. *Abdomen* slender, pubescent; lateral tergal processes of first segment closely appressed to sternite; pygidial area of seventh tergite of male entire, rounded.

Genotype: *Hesperonomada melanantha* n. sp.

This genus is related to *Nomada* but differs in the very short, five segmented maxillary palpi, finely punctured integument, and in having the lateral tergal processes of the first abdominal segment closely appressed to the sternite. From most of the subgenera of *Nomada* (*Heminomada* and *Melanomada* excepted) it also differs in having only two submarginal cells. *Hesperonomada* superficially resembles *Epeoloides* but may readily be distinguished by the elongate (rather than minute) last segment of the maxillary palpi, pointed marginal cell which is not separated from the costa at the apex, the more widely separated eyes with inner margins converging slightly below, and the form of the pygidial area in both sexes. From the Chilean genus *Herbstiella*[3], to which *Hesperonomada* may be related, it differs in the elongate (rather than broad) first discoidal cell and the simple mandibles.

Hesperonomada melanantha Linsley, new species

Female: Black, the mouthparts, flagellum, legs, and abdomen reddish; pubescence whitish. *Head* with vertex shining, finely, sparsely punctured; antennæ with scape and pedicel piceous, shining; flagellum dark reddish; frons dullish, a little more coarsely punctured than vertex, the punctures mostly separated by three or four puncture diameters; surface moderately densely,

[3] Hicks (1933, Am. Mus. Nov., 616:1) has recorded this genus from North America, describing a new species, *H. cockerelli* from California. An examination of the type by C. D. Michener and the writer reveals that the Hicks species is really a *Stelis* and *Herbstiella* should therefore be removed from our North American lists.

white pubescent, the hairs at side of face longer and more heavily plumose; clypeus pale reddish, darker at base, surface finely, sparsely punctured and pubescent; labrum pale reddish, more coarsely, subcontiguously punctured; maxillæ and palpi pale reddish; mandibles reddish with the apices rufo-piceous. *Thorax* black; pronotal tubercles clothed with white hairs; mesoscutum shining, moderately coarsely punctured, the punctures of anterior discal area close, nearly contiguous, those of posterior discal area irregularly spaced, varying from less than one to two or three diameters apart, surface very sparsely clothed with depressed and suberect, plumose hairs; tegulæ rufo-testaceous, very finely punctured; mesepisterna densely clothed with white pubescence; scutellum a little more finely punctured than mesoscutum, very sparsely pubescent; metanotum sparsely punctured, densely clothed at sides with suberect, heavily plumose hairs; legs reddish, femora shining, finely, sparsely punctured, sparsely clothed with long, white, simple hairs, a few plumose hairs beneath; tibiæ and tarsi a little more closely punctured and pubescent; wings tinted with fuscous, with a pale area before apex just beyond second submarginal and discoidal cells; veins and stigma dark brownish. *Propodeum,* except triangular area, moderately finely punctured, densely clothed with depressed, laterally directed, heavily plumose white hairs; triangle very finely, closely punctured, subglabrous except for anterior angles. *Abdomen* pale reddish, tergites one to four, finely, sparsely punctured at base, with a broad, impunctate apical margin, these tergites sparsely clothed at sides with suberect, plumose hairs which under very low magnification suggest vague lateral bands or patches; tergite five finely, sparsely punctured at base, sparsely clothed with suberect, simple hairs, pseudopygidial area very densely clothed with short pubescence which obscures the surface; processes of sternite six with a number of black hairs at apex. Length: 5.5 mm.

Male: Black, including antennæ, legs, and abdomen, only the labrum, mouthparts and tarsi reddish; abdominal tergites one to five with a broad impunctate margin; pygidial area of seventh tergite finely punctured; apex broadly rounded. Length: 5.75 mm.

Holotype female (No. 4791, Calif. Acad. Sci., Ent.), and allotype male (No. 4792), captured at the Hastings Natural History Reservation near Jamesburg, California, in the Santa Lucia Mts., June 8-11, 1938, by Charles Michener. Paratypes: one male with the same data as the allotype, in the collection of Mr. Michener, one male from Antioch, California, September 10, 1936, M. Cazier collector, in the collection of P. H. Timberlake, one male from Westwood Hills, Los Angeles County, Cali-

fornia, July 27, 1935, in the collection of the writer, and one female, Laguna Beach, California (Baker).

H. melanantha resembles a species of *Nomada* (undescribed?) common on *Salix* at Berkeley, California.

Triopasites Linsley, new genus

Female: Integument finely punctured; vestiture not squamiform. *Head* nearly as wide as thorax; eyes with inner margins converging slightly below, widest at lower one-fourth, barely separated from base of mandibles; ocelli arranged in a triangle, hind margin of anterior ocellus barely intersecting a line tangent to anterior margins of lateral ocelli, anterior and lateral ocelli separated by a little less than the diameter of a single ocellus; antennæ inserted on a line a little below middle of eyes, scape slender, about four times as long as broad, pedicel nearly as long as broad, about one-half as long as first flagellar segment, first segment of flagellum a little longer than second, remaining segments subequal in length, except the last which is nearly one and one-half times as long as broad; labrum wider than long, subtriangular; mandibles short, armed with a feeble internal tooth; maxillary palpi very short, composed of three free segments which are more or less subequal in length, last segment slender, more or less acute at apex; labial palpi elongate, first segment a little half times as long as broad; labrum wider than long, subequal in length, together about two-thirds as long as second. *Thorax* robust; mesoscutum with median line impressed; axillæ very feebly dentate; scutellum almost evenly convex, indistinctly bilobed; metanotum about one-third as long as scutellum; anterior coxæ longer than broad; mesepisterna convex, anterior and ventral angles obtusely rounded; anterior wings with three submarginal cells, the first nearly as long as the second and third together, second receiving first recurrent nervure at about middle, third receiving second recurrent vein near apex, marginal cell large, nearly as long as discoidal cell, apex distinctly separated from costa, obliquely truncate; intermediate and posterior legs short, stout, their tibiæ with a few short spines on outer faces, claws simple, neither cleft nor toothed, pulvilli short, apex not swollen. *Abdomen* with five visible sternites, the sixth represented by a pair of narrow, projecting processes armed at the apex with a few diverging spines; fifth tergite with a pseudopygidial area at apex.

Genotype: *Triopasites timberlakei* n. sp.

This genus exhibits a remarkable combination of characters, some of which appear to bridge the gap between the Nomadine and Pasitine genera. In the former group it appears to be re-

lated to *Hesperonomada*, differing primarily in the form of the marginal cell (separated from costal margin), number of submarginal cells, and the short, three segmented maxillary palpi. The first of these characters will distinguish *Triopasites* from all of the Nomadine genera but *Hexepeolus*. In the Pasitine group, the genus bears a striking, although possibly superficial, resemblance to *Pasites* and *Oreopasites*. It may be distinguished from these genera by the venation of the anterior wings (marginal cell rounded at apex, three submarginal cells), the absence of carinæ along the inner ocular margins, the short, broad labrum, and the presence of a pygidial plate on the sixth abdominal tergite of the female.

Triopasites timberlakei Linsley, new species

Female: Black, mouthparts, legs, and abdomen pale reddish. *Head* sparsely clothed with short, suberect, heavily plumose white hairs; vertex finely, sparsely punctured about antennal bases, where the punctures are one to two diameters apart, more coarsely and irregularly near margin of eyes; antennæ reddish piceous, scape polished, very sparsely punctured; clypeus reddish, shining, finely sparsely punctate, the punctures mostly from four to six diameters apart, surface sparsely clothed with short, fine hairs; labrum similarly but more coarsely punctured than clypeus; mandibles pale reddish, becoming piceous toward apex. *Mesoscutum* polished, subglabrous, more coarsely punctured than head, punctures of disk largest and varying from nearly contiguous along median line to from one to three diameters apart at sides; tegulæ testaceous, darker at middle; scutellum punctured similarly to scutum, subglabrous; metanotum densely clothed with long, heavily plumose, white hairs; mesosternum shining, sparsely, coarsely punctured, the punctures mostly separated by from one to five diameters; mesepisterna moderately coarsely, closely punctured, sparsely clothed with depressed pale hairs, anterior coxæ clothed beneath with long, heavily plumose white hairs; legs moderately clothed with long pale hairs. *Propodeum* with sides coarsely punctured, clothed with long, white, plumose hairs, triangular area subglabrous, dull, tessellate. *Abdomen* dullish, tergites finely punctured at base, apical margin depressed, almost impunctate; tergites one to four sparsely clothed with very short, fine, inconspicuous pale hairs except for lateral apical margins which bear a transverse patch of long, heavily plumose, white hairs; pseudopygidial area of fifth tergite finely punctured, clothed with fine, erect, simple hairs; sternites finely punctured, sparsely clothed with long, depressed, pale hairs. Length: 5 mm.

Holotype female, from Riverside, California, May 10, 1926, in the collection of Mr. P. H. Timberlake who very kindly sent the specimen to the writer for study.

This species has almost exactly the form and coloration of an undescribed species of *Oreopasites* which occurs in the same region.

Paranomada velutina Linsley, new species

Male: Black, integument polished, shining, almost impunctate; pubescence white and ochraceous. *Head* distinctly narrower than thorax; occiput thinly clothed with pale pubescence; vertex subglabrous, with only a few, scattered hairs; ocelli small, anterior ocellus in a slight depression, separated from lateral ocelli by more than a single ocellar diameter; eyes small, attaining on vertex a line tangent to posterior margin of lateral ocelli, inner margins subparallel; frontal carina evanescent above, represented by a pit above antennal insertions; antennæ short, pedicel about as long as broad, flagellar segments subequal in length, wider than long, the first a little longer than the second; frons about antennal bases densely clothed with moderately long, suberect, pale pubescence; clypeus subglabrous, dark reddish; labrum densely pubescent; mandibles pale reddish, apices piceous; maxillary palpi very short, composed of four free segments, the first longer than broad, second about three times as long as third, third and fourth subequal in length. Thorax broad, dorso-ventrally compressed; pronotal tubercles densely clothed with pale pubescence; mesoscutum slightly convex, median impression not evident, pubescent only along lateral margins; metanotum pubescent, more densely at sides; lower mesepisterna and mesosternum subglabrous, with a few, short, widely separated, suberect, fine hairs; legs reddish brown, coxæ not strongly lamellate externally; femora moderately densely clothed with long, suberect, pale hairs, tibiæ and tarsi densely pubescent; wings tinted with fuscous, anterior pair with a large pale area before apex beyond the last submarginal and the discoidal cells, veins and stigma brownish. *Propodeum* polished, irregularly pubescent, with a patch of depressed whitish hairs along lateral margins, a patch over anterior angles of triangular area, and a patch on each side of posterior angle of area. *Abdomen* shining; tergites finely, sparsely punctured at base, with scattered, short, suberect hairs; tergites two to six with a very dense, narrow, convex band of velvety, ochraceous pubescence along apical and lateral margins; seventh tergite clothed with long, erect and suberect, ochraceous hairs, pygidial area clothed with short, suberect hairs, apex subtruncate, entire. Length: 12.5 mm.

Holotype: male (in collection of P. H. Timberlake), from Douglas, Ariz., August 10, 1936, collected by Mr. W. W. Jones.

This interesting species shares so many characters with *Paranomada nitida* Linsley and Michener, that I have placed it in the same genus in spite of the fact that the maxillary palpi are only four segmented and the coxæ lack the broad, lamellate processes. Since *P. nitida* is known only in the female and *velutina* only in the male sex, it is possible that the lamellate coxæ represents a sexual character. If this is not the case, and the palpal differences prove constant, it may be necessary at some time to separate *velutina* either generically or subgenerically. Other differences, which may or may not be sexual, include the following: (1) in *velutina* the legs, and especially the posterior tibiæ, are more slender; (2) in *nitida* the gular groove is more narrowed posteriorly; and (3) in *velutina* the anterior metatarsus is robust and angulate beyond the middle whereas it is slender throughout in *nitida*.

AN EXOTIC CONODERUS NEW TO CALIFORNIA, WITH A NEW NAME FOR BICARINATUS VAN DYKE

(Coleoptera, Elateridæ)

Specimens of *Conoderus* (*Heteroderes*) *laurentii* (Guer.) have recently been collected near Huntington Park on the outskirts of Los Angeles. On July 10 and August 2, 1938, E. S. Herald, a University of California student, while working in his garden picked up several adult beetles.

This species is South American in origin, being represented in the British Museum, and Candeze Collection in the National Museum in Brussels by specimens from the West Indies, Argentina, Peru, Brazil and Colombia. It was first recorded in this country in 1927 in Southern Alabama (Hyslop, 1934), later in Florida and described by Blatchley as *fuscosus*. In my review of the genus (Proc. Calif. Acad. Sci., Series 4, 20:298, 1932), I wrongly identified it as *amplicollis* Gyll.

Conoderes bicarinatus Van Dyke (nec Reitter, 1891), described in the same paper, should be changed to **Conoderus arizonicus** Van Dyke, new name.—Edwin C. Van Dyke.

ORNITHODOROS TALAJE ON THE CALIFORNIA MAINLAND

BY THOMAS H. G. AITKEN

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While traveling in Southern California during the past spring, the writer collected specimens of what is believed to be the first actual record of *Ornithodoros talaje* (Guérin-Mèneville) on the California mainland. This species was described by Guérin-Mèneville(1) in 1849 from Guatemala. Banks(2) in his "Revision of the Ixodoidea, or Ticks, of the United States," reports examining specimens from Gum Cave, Citrus County, Florida; Brownsville, Texas, and San Clemente Island, California. It has also been reported from New York(3), Wisconsin, Minnesota, and Colorado, but is primarily a Mexican, Central and South American species.

The adult ticks, fortunately one male and one female, were discovered in the trunk at the rotted base of a Joshua tree (*Yucca brevifolia* Englm.) in the Mojave Desert, about one mile east of Palmdale, San Bernardino County (April 14, 1938). In hacking at the trunk, any signs of a rodent's nest that might have been present were destroyed; however a few bits of dried grass and brush as well as other debris were found, which might have been the remains of a nest.

The finding of this tick in the Mojave Desert is of interest in that it adds to the list of potential relapsing fever vectors in this state. *Ornithodoros hermsi* Wheeler, 1935, is the vector of California Relapsing Fever in the High Sierra(4), whereas *Ornithodoros talaje* is considered the principal agent in relapsing fever transmission in Mexico, Central America and northern South America. The third species which has been reported from California, *Ornithodoros turicata* (Duges 1876), is the arthropod vector in Kansas and Texas.

Determinations were made by Dr. Charles M. Wheeler, The George William Hooper Foundation for Medical Research, University of California.

Mr. D. E. Howell has recently informed the writer that on August 6, 1938, he collected what he determined as *Ornithodoros talaje* on the west slope of Mt. Diablo, Contra Costa County, at an approximate elevation of 2000 feet. The single

specimen, a last nymphal instar, was found at the side of a rodent hole. Mr. Howell's identification has been confirmed by Dr. R. A. Cooley, Rocky Mountain Laboratory, Hamilton, Montana.

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TWO NEW AEDES RECORDS FOR CALIFORNIA

(Diptera, Culicidæ)

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On the 20th of June, 1937, while collecting in northeastern Shasta County, the writer captured several unusual-looking mosquitoes which have since been identified as *Aëdes* (*Ochlerotatus*) *flavescens* (Müller) and *Aëdes* (*Taeniorhynchus*) *nigromaculis* (Ludlow). Neither of these species have previously been reported from California.

Aëdes flavescens (Müller) is distributed throughout the northern plains area of the United States and Canada, and has been recorded as far west as British Columbia and at Big Fork near Flathead Lake, Montana (Dyar, H. G. *The Mosquitoes of the United States.* Proc. U. S. Nat. Mus. Vol. 62, Art. 1, p. 74. 1922). Mail (*The Mosquitoes of Montana.* Montana Exp. Sta., Bull. 288, p. 30. 1934) states that the Big Fork record is doubtful, as it is the sole record west of the Divide, and furthermore the collection was made out of season, the mosquitoes being collected by E. Ricker, November 14, 1904. Mail suggests that Montana is the western boundary of the mid-continental range

of this species. Recent correspondence with Mr. H. H. Stage (Associate entomologist, U. S. Dept. Agric., Bureau of Ent. and Plant Quar., Portland, Oregon) permits me to further enlarge upon the distributional picture of this species. The following are definite Oregon records: Chewaucan Marsh (near Paisley), Lake County, June 16, 1931, and Adel, Lake County, July 16, 1932 (C. M. Gjullin Coll.); "OO" Ranch (near Burns), Harney County, August 21, 1933 (H. H. Stage Coll.). Stage states that *Aëdes flavescens* (Müller) has been found generally abundant throughout Malheur, Harney, Lake and somewhat in Klamath counties; it probably also occurs in Grant and Baker counties. This pestiferous species appears to be widely distributed throughout the desert and semi-desert regions of Eastern Oregon where it is found breeding in water from irrigation ditches that has overflowed onto alkali flats. It is quite probable that both of the species dealt with in this paper will be found in Eastern Washington and in the northeastern corner of California in Lassen and Modoc counties. *Aëdes flavescens* (Müller) also occurs in Alaska, Asia and Europe.

Aëdes nigromaculis (Ludlow) apparently is chiefly an inhabitant of the arid plains of the Middle West where it breeds in rain puddles and irrigation water. It has been reported from Brownsville, Texas, northwards on both sides of the Divide to Alberta and Saskatchewan. The westernmost record until now appears to have been Boise, Idaho, August 4, 1901, C. B. Simpson (reported by Dyar). Through the kindness of Mr. Stage additional data are available from Oregon. There are records of this species from the eastern part of the state, and in particular, Hereford, Baker County, May, 1932 (C. M. Gjullin Coll.). Martini reports the collection of this species (one female) by Dr. Dampf from Santa Lucrecia, Veracruz, México, September 9, 1930 (Martini, E. *Los Mosquitos de México.* Boletines Técnicos, Serie A: Entomología Médica y Parasitología. No. 1, Departamento de Salubridad Pública, México. D. F. 1935).

The above species, together with *Culex tarsalis* Coquillett, were collected as they flew up from the grass in a somewhat marshy field, caused by high water in the nearby river. The locality for this new western record in California is Warm Springs, some seven miles northeast of Glenburn in the Fall River Valley; the elevation is approximately 3400 feet.

NEW SPECIES AND SUBSPECIES OF WEST AMERICAN COLEOPTERA

BY EDWIN C. VAN DYKE

University of California, Berkeley, California

Family Lampyridæ

Genus **Brachylampis** Van Dyke, new genus

Small, short and compact. Head of moderate size, concealed from above by overhanging prothorax because of flexed position, when extended fully reaching the anterior margin of prothorax; antennæ neither pectinate nor serrate but robust, somewhat compressed and almost reaching middle of elytra, the second, or second and third, segments short and transverse, less than one-half the length of the following; remaining segments almost one-half longer than broad, the proximal subtriangular, the distal with sides somewhat parallel, the eleventh or terminal elliptical, rounded at apex and without an appendix; eyes rather large, somewhat coarsely granular and well separated. Prothorax transverse, broadly rounded in front, with anterior margin narrowly reflexed; base bisinuate, with median area broadly lobed and narrowly margined, the hind angles acute, divergent and carinate, with deep foveæ within. Beneath: middle coxæ contiguous; epipleura distinct and broad at base; legs flattened, the fourth tarsal segments bilobed, short, concealing only the base of last segment; last three abdominal segments testaceous, the last ventral rounded at apex.

Genotype: *Brachylampis sanguinicollis*, new species.

This peculiar genus apparently belongs in the tribe Lucidotini but it is anomalous, looking like none of the other genera in North America. Its peculiar features are its small size and compact body, the prothorax strongly bifoveate at base, with bisinuate posterior margin and well defined, divergent hind angles, the head inflexed and concealed from above but well developed and reaching front margin of pronotum when extended, the antennæ short and compact, with first or first and second segments very short, the following elongate and more or less parallel sided, fourth tarsal segments short, covering only the base of the last, and the last three ventral segments testaceous, the last rounded at apex. As far as I know, it does not emit light. In size and shape it somewhat resembles *Brachypsectra* or *Omethes*, being generally broader and more robust than the latter but of the same length.

Brachylampis sanguinicollis Van Dyke, new species

Figure 1.

Small, compact, subparallel, black except prothorax which is rufous and the three terminal ventral segments which are testaceous; sparsely, finely pubescent throughout. Head of moderate size, front punctured, clypeus feebly sulcate; antennæ robust, second segment small and transverse, about one-half length of third, the following feebly triangular and almost one-half longer than broad. Prothorax about twice as broad as long, feebly convex; sides somewhat convergent forwards from hind angles; front slightly arcuate; disk with a fine median longitudinal impression

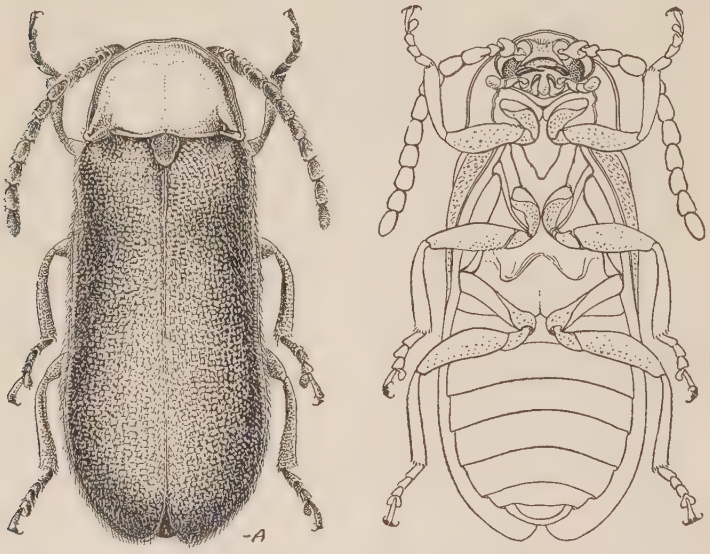

Fig. 1. *Brachylampis sanguinicollis* Van Dyke, n. sp., dorsal and ventral views. x 13.

and a small transverse ridge in front just behind the anterior reflexed margin; rather sparsely, feebly punctured; its other characters mentioned in the generic description. Scutellum well developed, rounded at apex, coarsely punctured, with short pubescence that appears slightly fulvous in strong light. Elytra twice as long as broad, subparallel and conjointly rounded at apex, the disk coarsely, irregularly punctured and rugose. Ventral surface rather finely punctured and scabrous. Length 5.25 mm., breadth 2 mm.

Holotype (No. 4766, Mus., Calif. Acad. Sci., Ent.) and numerous designated paratypes from a series of sixty-four specimens in my own collection in the California Academy of Sci-

ences, and forty-six specimens loaned me for study by Mr. Arthur T. McClay. All were collected at various times during June, 1929, from amongst the drift debris collected in a reservoir near Potwisha, Sequoia National Park, California. The color of the prothorax fades somewhat after death.

Brachylampis blaisdelli Van Dyke, new species

This species is very similar superficially to the preceding but differs by being in general slightly larger, proportionally broader, the prothorax in particular; by having the anterior prothoracic margin almost a complete semicircle as seen from behind, and the disk with a black spot extending from the apex to the middle of the base, the punctuation also considerably coarser; antennæ with segments II and III both small and transverse, II the larger; each about a third the length of IV which is triangular, twice as long as broad and somewhat broader than III or IV in *sanguinicollis*, the following segments gradually narrower toward the apex; scutellum subacute at apex, with a median longitudinal carina in front; and the elytra more coarsely and deeply sculptured.

Holotype (No. 4767, Mus., Calif. Acad. Sci., Ent.) from San Diego, California, and paratype from Poway, San Diego County, California, both collected by Dr. F. E. Blaisdell and now in his collection in the California Academy of Sciences. A third specimen from Mt. Wilson, Los Angeles County, California, collected in July, is in the Fenyes collection, also in the California Academy of Sciences. It is in agreement with the preceding in all regards except as to the color of the pronotum, this being entirely orange red.

This very distinct species is readily separated from the preceding by the type of antennæ and the more coarsely sculptured elytra, and in most cases by the maculate prothorax, as well as by its slightly larger size and proportionally broader antennæ.

Family Mycetophagidæ

Mycetophagus pluriguttatus franciscanus Van Dyke, new subspecies

Of the same size and form as *pluriguttatus* and sharing with it antennæ which have the three outer segments in the form of an elongated, slightly enlarged club; the prothorax broadest behind the middle, with rather evenly arcuate sides, subbasal foveæ somewhat elongate, and disk densely punctured; elytra with shal-

lowly impressed striæ that are finely, rather closely punctured on the disk but more or less obliterated at the sides and toward the apex; differing in color pattern, the entire insect being of a uniform piceous color except for the legs, which are generally rufous, the apical antennal segment, which is often testaceous, and the prothorax, which is sometimes rufopiceous or at least lighter in shade than the elytra. Length 5.5 mm., breadth 2.5 mm.

Holotype (No. 4768 Mus., Calif. Acad. Sci., Ent.) and several designated paratypes, collected by myself in the Oakland hills, California, March 28, 1920, or on other dates. This very distinct and more or less unicolorous subspecies seems to be limited to the San Francisco Bay region. In former years I used to find it quite frequently during the winter months or early spring about the fungus growths of decaying stumps in the hills back of Oakland. Our series in the collection of the California Academy of Sciences consists of over twenty-three specimens, all remarkably uniform as to size and coloration. These were collected in the following localities: Oakland hills, Berkeley, Lake Lagunitas and other places in Marin County, San Francisco and Carmel, all collected by either Dr. F. E. Blaisdell or myself.

The more typical bicolored *pluriguttatus* is generally found more inland, particularly in the Sierra Nevada Mountains. Once or twice I have found the coastal subspecies with more or less well defined subapical elytral light markings but never any specimens with a color pattern approaching that of the typical form.

Family Pythidæ

Cononotus bryanti Van Dyke, new species

Very elongate, rufotestaceous, with fine, closely appressed gray pile, sufficiently dense to in great part conceal the sculpturing. Head, including the eyes, about as broad as apex of prothorax; rather finely, somewhat densely and indistinctly punctured; front longitudinally subcarinate at middle; eyes rather large yet feebly convex; antennæ about reaching base of prothorax, with all segments longer than broad, but segments IX and X very slightly so. Prothorax obconical; three-fourths as broad as long and broadest one-fourth distance from apex; apex almost twice as broad as base; sides feebly sinuate behind; disk densely and shallowly punctured. Elytra elongate elliptical, almost two and a half times as long as broad, convex; punctures fine and irregularly distributed though to a great extent concealed by the pubescence. Length 3.75 mm., breadth 1 mm.

Holotype (No. 4769, Mus. Calif. Acad. Sci., Ent.) collected in the Tuscon Mountains, Arizona, March 15, 1936, by Owen Byrant and kindly presented by him. Five paratypes, also from the same locality, collected February 21, 1937, by Mr. Bryant, four of which will be returned to the collector.

Of the three species with elytral punctures irregularly distributed, this species may be distinguished by being much the narrowest as well as by being somewhat coarsely pubescent.

Cononotus lanchesteri Van Dyke, new species

Elongate, somewhat flattened, rufotestaceous, and sparsely clothed with short, fine, closely appressed pile. Head, including eyes, as broad as apex of prothorax; rather coarsely, closely and somewhat cribrately punctured; eyes prominent; antennæ reaching base of prothorax, segments IX and X about as broad as long. Prothorax obconical; almost as broad as long, broadest close to apex; apex twice as broad as base; sides feebly sinuate behind; disk densely punctured. Elytra elongate elliptical, over twice as long as broad; feebly convex above, with sides subcarinate; punctures on disk distinct though fine and irregularly distributed in front and very minute, almost imperceptible behind, the general surface feebly shining. Length 4.25 mm., breadth 1.30 mm.

Holotype (No. 4770, Mus. Calif. Acad. Sci., Ent.), and three paratypes, collected at Parma, Idaho, March 24, 1930, by H. P. Lanchester, and by him very kindly presented to me. A single specimen in the Fenyes Collection, from "Leeds Ut., Aug. 4-7, Wickham," belongs with the above.

This species is the longest in the genus and may be separated from the preceding, which is also very elongate, by being slightly broader and flatter, more finely, sparsely punctured and by having the head more coarsely punctured, the outer segments of the antennæ also a bit more transverse.

Synoptic Key to Cononotus[1]

1. Elytra with punctures fine but numerous and irregularly dispersed; length 2.75-4.25 mm..... 2
–. Elytra with punctures more or less regularly arranged in rows and generally coarser..... 4
2. Pubescence fine and sparse, not perceptibly concealing sculpturing; prothorax almost as broad in front as long..... 3
–. Pubescence quite evident, concealing sculpturing to quite a degree; prothorax narrower in front than long; elytra elongate

[1] An elaboration of the key published by me in Bull. Brooklyn Ent. Soc., XXIII, pp. 258-259, 1928.

elliptical, almost two and one-half times as long as broad; length 4 mm., S. Arizona ..... *bryanti*

3. Head finely and discretely punctured; antennæ with segments VII to X distinctly transverse; prothorax broadest one-fourth distance from apex; elytra elliptical, twice as long as broad, somewhat dull and with punctures moderately coarse and close in front and very fine behind; length 2.75-3.25 mm. S. California ..... *sericans*

–. Head coarsely and closely, somewhat cribrately punctured; antennæ with segments all as long as, or longer than, broad; prothorax broadest close to apex; elytra elongate elliptical, over twice as long as broad, somewhat shining and with punctures fine and sparse in front and very minute behind; length 4.25 mm. Idaho ..... *lanchesteri*

4. Pubescence fine and sparse, not concealing sculpturing 5

–. Pubescence dense; elytra elliptical, striæ not impressed; length 3 mm. Owens Valley, California ..... *macer*

5. Larger and darker species; elytral striæ evidently impressed, elytra slightly broader anteriorly; length 2.5-3 mm. Los Angeles, California ..... *striatus*

–. Smaller and more testaceous colored species; elytral striæ not distinctly impressed, elytra elliptical; length 1.75-2 mm. Santa Clara and Alameda counties, California ..... *punctatus*

Family Pyrochroidæ

Dendroides pacificus Barrett (1932) = *D. marginata* Van Dyke (1928).

Rhipidothrips Brunneus Williams

This species was described by Mr. C. B. Williams in 1913 (Records and Descriptions of British Thysanoptera, Journal Economic Biology, Vol. VIII, No. 4, pp. 216-230) and, so far as known up to the present time, has been found only in Sussex, England.

On April 8th and 15th, 1936, Messrs. George Ferguson and B. Crowell made collections of this species on Canary grass, oats and Osmaronia flowers at Corvallis and Granger, Oregon (Moulton Nos. 5547 and 5548). This identification is from printed description only and not by comparison with identified material but there can be little doubt as to its proper classification. This is the first record of the finding of this species in North America.—Dudley Moulton.

NOTES ON SYMPHYLA WITH DESCRIPTIONS OF THREE NEW SPECIES OF SYMPHYLELLA FROM CALIFORNIA

BY A. E. MICHELBACHER

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Members of the class Symphyla are widely distributed throughout California. During the past year considerable time has been devoted by the author to a search for members of this class. They have been found under a wide variety of conditions, and apparently can be collected in practically any location in the region adjacent to San Francisco Bay. Representatives of the class have been found in pasture land, on hill sides, along stream banks, in forested areas, at Point Reyes on the beach at highest tide level, and in fact in almost every conceivable environment. They may be found in soils varying from sands to clays. They are probably as abundant in nature as most other arthropods.

Although a number of new species have been collected, only three members belonging to the genus *Symphylella* will be described in this paper. The writer believes that considerable caution should be practiced in describing new species because the variation found within a species is so great that it would be quite possible to describe two different stages of the same species as new. In working out the life history of *Scutigerella immaculata* (Newp.)[1] marked variations were observed even after the animals reached the stage with twelve pairs of legs. It was found that they moult from time to time throughout their entire life, and that this makes possible morphological changes.

No life-history study has been attempted with any other member of the class, but enough information is at hand to indicate that most of the species have a rather complex life history. For example, in studying cleared and stained large specimens of *Symphylella subterranea*, an individual was encountered which at the time it was collected was just about ready to cast its skin. On the slide the old and new integuments are easily seen, one within the other. This specimen was as large as any I have ever collected, indicating that moulting in this species probably occurs from time to time even after sexual maturity is reached. Other specimens have been examined in about the same condition, where a new skin can be seen within the old one.

[1] Michelbacher, A. E. The biology of the garden centipede, *Scutigerella immaculata*. Hilgardia, 11 (3): 55-148, 1938.

In studying large series of individuals which appear to be mature, variations in size, number of antennal segments, and number of setæ on the various anatomical regions are encountered. These variations are probably the result of the moulting characteristics of the group. Because of these differences, I have found it very difficult to describe a species and believe it inadvisable to do so unless an investigator has a large series with which to work. Several symphylans have previously been described from one or two specimens, but such a practice can often lead to confusion. In some cases much stress has been placed on chaetotaxy. The present study certainly shows that in the same species the chaetotaxy of two individuals may show considerable variation.

The following descriptions are made from prepared mounts and all measurements given have been obtained from mounted specimens.

Symphylella subterranea Michelbacher, n. sp.

Figures 1a to 1g

Head somewhat elongate, about 1.3 times longer than wide; central rod (coronal suture) interrupted at the middle, without median lateral branches; anterior branches (frontal sutures) prominent but less distinct than the central rod; post-antennal organs of average size. *Antennæ* with 18 to 23 segments (holotype 21 segments); setæ on basal segments very prominent and rather long, but much reduced on the distal segments; setæ on inner side of the basal segments nearly twice as long as those on outer side; beginning of a second whorl of setæ at about the 7th or 8th segment; with several small circular sensory organs along greatest circumference of ante-apical segment, this segment usually containing the largest number of these organs, although they may be present on the next 11 or more segments toward the the proximal end. On the right antenna of the holotype there are three of these organs on the second segment and one each on the next 13 segments while on the left antenna there appear to be two such organs on the second segment and one each on the next 12 segments. Only the 13 *scuta* having the triangular processes are considered and these are referred to by numbers; processes all triangular in shape, their tips produced into small knobs. Knobs in the holotype generally round, their greatest diameter usually slightly more than the width of their attachment. Anterior-lateral setæ of second scutum much shorter than the processes. First pair of *legs* reduced to wart-like structures, remaining pairs well developed, and sparsely covered with setæ.

Tarsus of last pair of legs about 4.3 times as long as wide, its upper surface with six rather prominent setæ which are as long as, or a little longer than, width of tarsus. Tibia of last pair of legs with four rather prominent setæ on upper surface, their length equal to about half the depth of the segment. *Styli* very much reduced, cone-shaped, densely covered with short hairs, and about twice as long as their width at base. Seven pairs of fully developed *coxal sacs* located at bases of fully developed legs from second to eighth pairs inclusive. *Cerci* large and well covered with setæ, those setæ on the inner surface curved and of nearly equal length, while those on the outer surface are of two types—short, more numerous curved setæ, and larger protruding setæ. Striped organ only about the length of the apical setæ or not quite as long as the longest lateral setæ. Length of cerci about 3.5 times their greatest width. *Length* of holotype 5.1 mm.

Holotype, No. 4798, Calif. Acad. Sci., Ent., Clarksburg, California.

Occasionally specimens are encountered in which the knobs are elongate on some of the scuta. In such cases their greatest width is nearly the same as their attachment. The number of setæ between the anterior lateral and the apical setæ of the scuta shows considerable variation even in mature specimens. The variation in the type and the range in variation is shown in table 1. The number of marginal setæ on the two sides of the same scutum of the same individual may show some variation.

This species has only been collected in a single field where it was encountered in fair abundance. It inhabits the lower layers of soil and can seldom be taken above a depth of six inches. It is not attracted to growing vegetation and probably feeds on fungus. It is rather slow in motion.

Probably the most prominent feature of this species is its large size, which distinguishes it from most other members of the genus. It is most closely related to *S. essigi* n. sp. and the differences are considered under the description of the latter species.

Symphylella essigi Michelbacher, n. sp.

Figures 2a to 2h

Head somewhat elongate, about 1.2 times as long as wide; central rod (coronal suture) interrupted at about middle, without median lateral branches; anterior branches (frontal sutures) prominent, but slightly less distinct than the central rod. Post-antennal organs of average size. *Antennæ* of 18 to 21 segments

(holotype 21 segments); setæ very prominent and rather long on basel segments but much reduced on distal segments; setæ on inner side of basal segments about one and one-half times as long as those on outer side; a second whorl of setæ beginning at about the sixth segment. Beginning with the second from the apical segment, and in the type on the next six segments, small circular sense organs are found which are in line with the whorl of primary setæ. The number of sense organs found on the different segments starting with the third from the apical segment on the right antenna is 2, 2, 1, 1, 1, 1, 1; for the left antenna 2, 2, 1, 1, 2, 2, 2. This is a variable character and even in mature specimens these sense organs may be present on only five segments. The most constant feature is that they apparently always start with the second segment from the apex. Only the 13 *scuta* having the triangular processes are considered and these are referred to by numbers. In all cases the triangular processes are prominent and their tips rounded. There is a comparatively slight indication of the tips being produced into knobs. The number of setæ between the anterior lateral and the apical setæ shows considerable variation even in mature specimens. The variation in the type and the range in variation expected to occur in the species is shown in table 1. The number of marginal setæ on the two sides of the same scutum of the same individual may show some variation. The anterior-lateral setæ of the second scutum are shorter than the processes. First pair of *legs* reduced to wart-like structures, the remaining pairs well developed and sparsely covered with setæ. Tarsus on the last pair of legs about four and one-half times as long as wide, its upper surface with eight rather prominent setæ about as long as the depth of the segment. This character shows some slight variation as individuals with seven or nine setæ are encountered. Tibia of the last pair of legs with four rather prominent setæ on the upper surface (in the holotype there are six), their length equal to at least one-half the depth of the segment. *Claws* very unequal, the anterior one being twice the size of the posterior. *Styli* much reduced, cone-shaped, densely covered with very short hairs, about twice as long as their width at the base. Seven pairs of fully developed *coxal sacs* are located at bases of fully developed legs from second to eighth pairs inclusive. *Cerci* large, well covered with recurved setæ which are all about the same length, although there may be one or two protruding setæ which are slightly longer than the rest. Striped organ only about as long as the apical setæ. Length of the cerci at least three times their greatest width. The holotype, which is not normally extended, measures 3.8 mm. Large, normally extended individuals should measure 4 mm. to 4.8 mm.

Holotype, No. 4799, Calif. Acad. Sci., Ent., collected on a stream bank in a silty loam near Moraga, Contra Costa County,

California. Other specimens have been collected in several localities in Marin and Napa counties. It is possible that some of the individuals collected in these latter localities may prove to be new although no character has yet been found to separate them. This species is adapted to a wide range of soils and has also been taken in the sand hills at Point Reyes.

This species is rather closely related to *Symphylella subterranea* but is easily separated from it by several good characters. The tips of the triangular processes of the scuta are rounded whereas in *S. subterranea* they are produced into knobs. Also, fewer setæ are found along the lateral margins of the scuta in *S. essigi*. There are fewer setæ on the upper surface of the tarsus of the last pair of legs in *S. subterranea* than in *S. essigi*. The peculiar circular sensory organs are present on the second from the apical segment in *S. essigi* whereas in *S. subterranea* they are found on the first from the apical segment and occur on a larger number of segments toward the proximal end. In *S. subterranea* the setæ on the outer side of the cerci are long and short whereas in *S. essigi* they are nearly of the same length.

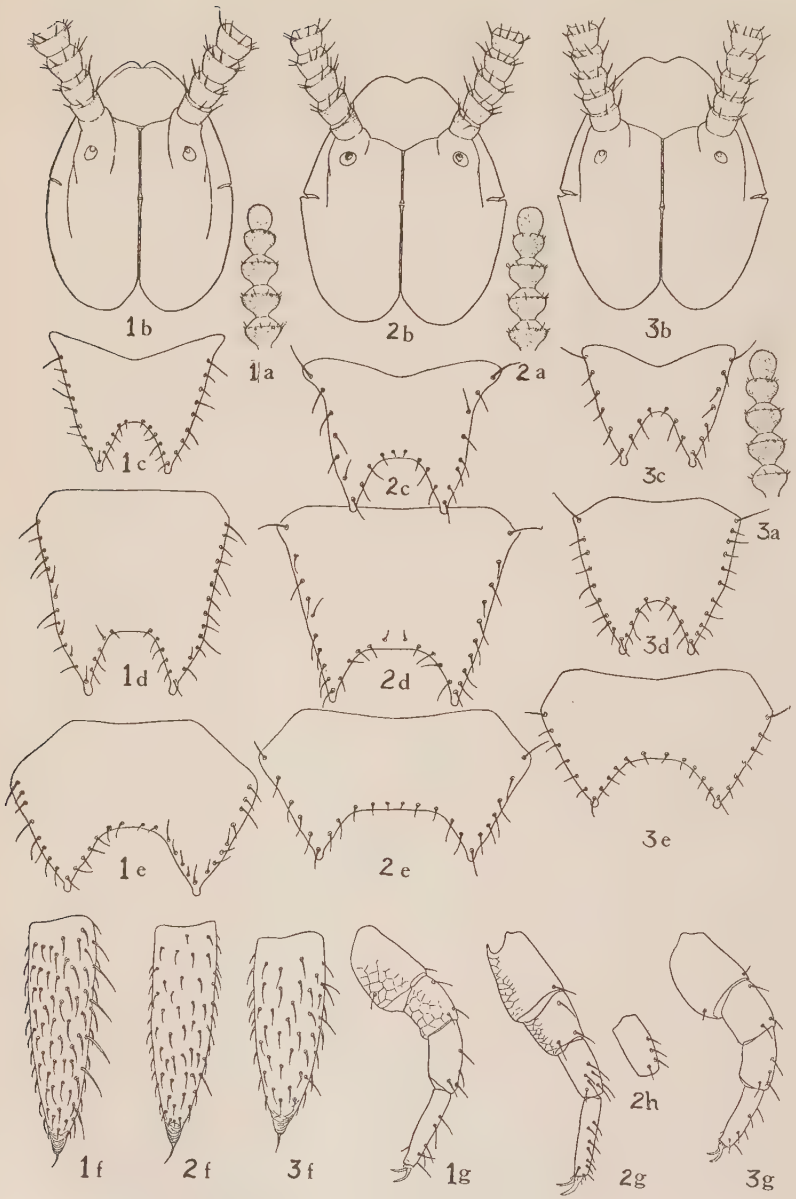
TABLE I

Number of Setæ Found between the Anterior Lateral Setæ and the Apical Setæ on the Scuta which have Triangular Processes.

Scutum number	Symphylella subterranea sp. n.		Symphylella essigi sp. n.		Symphylella capitata sp. n.	
	Number of setae*	Range in the number of setae**	Number of setae*	Range in the number of setae**	Number of setae*	Range in the number of setae**
1	7 - 7	6 - 7	5 - 6	4 - 6	5 - 4	4 - 7
2	12 - 11	9 - 12	8 - 8	7 - 8	8 - 9	6 - 9
3	7 - 7	5 - 7	4 - 5	4 - 6	5 - 5	4 - 5
4	8 - 7	6 - 8	6 - 5	4 - 6	6 - 6	5 - 7
5	13 - 13	9 - 13	9 - 9	8 - 9	9 - 9	6 - 9
6	9 - 8	6 - 9	5 - 5	5 - 6	5 - 5	4 - 6
7	9 - 10	7 - 10	6 - 5	4 - 6	6 - 5	5 - 7
8	10 - 12	9 - 12	8 - 7	7 - 9	8 - 9	7 - 9
9	7 - 6	5 - 7	5 - 4	4 - 6	4 - 4	4 - 5
10	9 - 7	6 - 9	6 - 5	4 - 6	7 - 6	4 - 6
11	10 - 11	9 - 11	7 - 7	7 - 8	7 - 7	6 - 9
12	5 - 6	5 - 7	3 - 4	3 - 5	4 - 3	3 - 5
13	9 - 9	6 - 9	6 - 6	4 - 6	5 - 4	4 - 7

*The number of submarginal and marginal setæ, between the anterior lateral setæ and the apical setæ, and the variation observed on the two sides of the same scutum in the type specimen.

**Range in the number of submarginal and marginal setæ between the anterior lateral setæ and the apical setæ.



EXPLANATION OF PLATE

Fig. 1. *Symphylella subterranea* n. sp. 1a tip of antenna, x 80; 1b head, x 80; 1c to 1e first three large scuta, x 95; 1f spinneret, x 110; 1g hind leg, x 100.

Fig. 2. *Symphylella essigi* n. sp. 2a tip of antenna, x 80; 2b head, x 80; 2c to 2e first three large scuta, x 95; 2f spinneret, x 105; 2g hind leg, x 95; 2h tibia of hind leg showing usual number of setæ, x 95.

Fig. 3. *Symphylella capitata* n. sp. 3a tip of antenna, x 130; 3b head, x 130; 3c to 3e, first three large scuta, x 140; 3f spinneret, x 140; 3g hind leg, x 135. Only marginal and submarginal setæ have been drawn on the scuta.

Symphylella capitata Michelbacher, n. sp.

Figures 3a to 3g

Head somewhat elongate, about 1.2 times as long as wide; central rod (coronal suture) interrupted at about middle without lateral branches; anterior branches (frontal sutures) prominent but not as distinct as central rod; post-antennal organs of average size. *Antennæ* of 17-22 segments (holotype 18 segments); setæ very prominent and rather long on basal segments but much reduced on distal segments; setæ on inner side of basal segments slightly longer than those on outer side. Beginning with the first from the apical segment and on the next ten segments in the holotype, small circular sense organs are found which are in line with the whorl of setæ. On the first from the apical segment there are three organs and on the other segments one each. The number of segments carrying these sense organs shows some variation within the species, but in mature specimens they should be found on at least 11 segments. In some cases the apical segment may carry a single sensory organ. This was found rather commonly in specimens collected at Lagunitas, California. The arrangement in one large specimen from that locality, which has 22 segments in the right antenna, is as follows, starting with the apical segment: 1, 4, 1, 2, 1, 1, 1, 1, 1, 1, 2, 1, 1, 1, 1, 1. The number found on the two antennæ of the same individual may show some variation. Only the 13 *scuta* having the triangular processes are considered and these are referred to by numbers. In all cases the triangular processes are prominent and their tips are produced into rounded knobs whose diameters are about one and one-half times the width of their attachment. The number of setæ between the anterior-lateral and the apical setæ shows considerable variation even in mature specimens. The variation in the holotype and the range in variation expected to occur in the species is shown in table 1. Anterior-lateral setæ of second scutum about two-thirds as long as processes. First pair of *legs* reduced to wart-like structures, the remaining pairs well developed and sparsely covered with setæ. Tarsus of the last pair of legs about three and one-half times as long as wide, its upper surface with six prominent setæ which are as long as the greatest depth of the

segment. Tibia of the last pair of legs with four prominent setæ on the upper surface which are at least as long as one-half the width of the segment. *Styli* very much reduced, cone-shaped, densely covered with very short hairs, about one and one-half times as long as their width at the base. Seven pairs of fully developed *coxal sacs* located at the bases of fully developed legs from second to eighth pairs inclusive. *Cerci* large, well covered with setæ; setæ on inner surface recurved and all of about the same length, while those found on the outer surface are of two types—recurved setæ similar to those found on the inner surface, and much longer straight setæ. Striped organ about the length of the apical setæ. Length of cerci about three times their greatest width. *Length* of holotype, 3 mm.

Holotype, No. 4800, Calif. Acad. Sci., Ent., Tunnel Road Canyon, Oakland, California, January 22, 1938. Specimens were found abundant on canyon slope in first two inches of soil. This species is rather widespread, having been taken on El Cerrito Hill, El Cerrito, California, and in several localities in Marin and Napa counties. Collections were made during the months of January to April inclusive, and individuals were found most abundant in the first two inches of soil. Moist sedimentary soils having a grass cover appeared to be localities best suited to the species.

This species appears to be rather closely related to *Symphylella pusilla* (Han.) but can easily be distinguished from that species by its larger size and fewer antennal segments. Also in *S. pusilla* there are fewer setæ on the second scutum between the anterior lateral and apical setæ. The large rounded knobs found on the tips of the triangular processes also tend to separate *S. capitata* from other members of the genus.

Personal Note

Owing to the rapid growth of the Department of Entomology of the California Academy of Sciences it has become increasingly difficult for me to keep up with that work and at the same time to do justice to the editing of the Pan-Pacific Entomologist. I have, therefore, asked the Publication Committee to find some one else to act as editor. They have now selected R. L. Usinger as such editor, and correspondence regarding editorial matters connected with this journal should be addressed to him, here at the California Academy of Sciences.—E. P. Van Duzee.

GEOMETRID NOTES AND NEW SPECIES

BY EDWARD GUEDET

Napa, California

Racheospila tenuimargo Warren

This pretty little species, described Nov. Zool. XII, 319, 1905, is fairly common on the east coast of Mexico, and extends south as far as Guiana. Two specimens taken by Mrs. Leslie Forsythe at Florida City, south of Miami, Florida, are in my collection. This should be of interest to those who like a record of strays from other lands.

Stamnoctensis vernon Guedet, n. sp.

Primaries pointed at apex, light ochreous, irrorate with reddish brown, especially along the costa and outer margin. Costa marked with three dark brown spots. The basal area dark, especially along the costa. First spot one-fourth from the base of the wing, outwardly oblique. Second about the middle of the costa and heavier and broader than the first, preceded by an indefinite, broad, light, median shade, which crosses the costa at right angles and is lost in the ground color. The third spot about three-quarters out from the base of the wing, marking the beginning of brownish subterminal line. Subterminal line angled inwardly on the subcostal vein, running thence outwardly and obliquely to vein V, where it is sharply angled, and curving slightly inwardly, attains the inner margin about two-thirds out from the base of the wing. This line is followed by a light ochreous band. A horizontal dash extends from this band toward the apex, where it separates into two branches. In the subterminal area the veins are free of the darker irrorations. Fringe checkered with reddish brown.

Secondaries light ochreous, with the markings of the underside showing through.

Primaries beneath marked much as above. The horizontal dash in the subapical region showing more prominently on account of the darker background. Secondaries beneath light ochreous, with a reddish brown dash which is outwardly oblique at the center of the costa. Median vein distinctly marked with reddish brown, with a series of horizontal striations of reddish brown across the median area.

The distinctive feature of this species is a heavy reddish brown line which begins in the center of the subterminal area and runs with a slight outward curve toward the center of the inner margin without reaching it. There is a lighter reddish brown shade between this line and the outer margin.

I propose for this species the name *vernon* after the type locality.

Holotype, male, (No. 4779), Vernon, Apache County, Arizona, July, 1936, and allotype, female (No. 4780), same data, both in the collection of the California Academy of Sciences, San Francisco, California. Paratypes, two males and one female, same data, in my collection; one male, same data, in collection of the United States National Museum, Washington, D. C., one male, Jemez Springs, New Mexico, June; one male, Jemez Springs, no date; one male, Bent, New Mexico, no date; two males, "New Mexico," April 1, 8, all in my collection.

Philedia punctomacularia connecta Guedet, n. var.

Philedia punctomacularia Hulst was described (Ent. Amer. Vol. III, page 214, 1888) from two males and two females taken in California and Vancouver Island, B. C. The male type is pictured in Holland's Moth Book, plate 43, fig. 59. Dr. Harrison Dyar (Proc. U. S. Natl. Mus. Vol. XVII, page 909, 1904) tells us on the authority of Mr. Theodore Bryant that the food plant is the common brake (*Pteris*). In the British Columbia Check List (1927) it is listed as inhabiting Southern Vancouver Island, Lower Frazer Valley and Kaslo.

On the primaries of the typical form, the ante-median line is "marked by a short black streak on each vein" and there is a post-median "row of black points on the veins nearly parallel with the outer margin." The secondaries have this post-median row of black points.

A series of nine specimens from Carmel, California, have these points connected so as to form diffuse bands. The ante-median band of the primaries is light brown, broad, diffuse, shading outwardly toward the center of the wing. The discal spot is also light brown and diffuse. The post-median band on both wings is broad, light brown, with the veins faintly marked with minute, black points. The ground color is light brown, rather than the typical blue gray. For this variety, which is without a name, though present in many collections, I propose the name connecta.

Holotype, male (No. 4781), Carmel, Nov. 5, 1925 (L. S. Slevin), allotype, female (No. 4782), Carmel, Dec. 25, 1933 (L. S. Slevin), both in the collection of the California Academy

of Sciences. Paratypes, male and female, same data, in my collection, and in the collections of the California Academy of Sciences and in the U. S. Natl. Mus., Washington, D. C.

Phengommatæa olifata Guedet, n. sp.

Expanse 35 mm. Head, antennæ, thorax and abdomen light ochre-yellow. Primaries light ochre-yellow, crossed by a darker yellow band. Basal area lightly shaded with brown. Inner edge of the median band with a dark brown line, beginning on the costa half way out, sweeping sharply outward around a diffuse, linear, discal spot, then curving inward and going with a very slight wave to inner margin about one-fifth from base. Inner side of this line without the brownish shading of the basal area. Exteriorly this line is heavily shaded with brown. A similar dark brown line marks the outer edge of the median band. This line, beginning on the costa 3 mm. from the apex, is slightly and evenly sinuate and reaches the inner margin about 5 mm. from the anal angle; it is bordered inwardly by a brownish shading and outwardly by an even band of the ochre-yellow ground color; between these two lines the wing is dark brownish yellow. Subterminal area shaded with a dark ochre color, but not so dark as the median area; median veins slightly shaded with brown.

Secondaries light yellow, their only maculation being a sinuate post-median dark brown line, accented by dots on the veins. Subterminal and terminal areas slightly darker.

Primaries beneath light yellow with a diffuse, brownish cloud running from the base almost to the discal area in the upper half of the wing; discal spot linear, a trifle less diffuse than above; the dark yellow median band being very faintly reflected. Secondaries also light yellow, their only maculation being a row of dots on the veins in the subterminal area parallel to the outer margin. This row of spots does not correspond with the post-median line on the upper side of the secondaries.

It gives me great pleasure to propose for this beautiful species the name *olifata*, in honor of Reverend J. A. McAuliffe, of San Francisco, through whose kindness and encouragement I became interested in the study of *Lepidoptera*.

Holotype, male, No. 4783, Turkey Flat, Chiricahua Mountains, Cochise County, Arizona, 9000 feet, July 22, 1927 (J. A. Kusche), allotype, female, No. 4784, same data, both in the collection of the California Academy of Sciences. Six paratypes, male and female, same data, in my collection and in the collection of the U. S. Natl. Mus., Washington, D. C. and six paratypes, male and female, Fly's Peak, Chiricahua

Mountains, Cochise County, Arizona, 9800 feet, July 10-30, 1927, in the collection of the California Academy of Sciences, San Francisco.

Caripeta piniata suffusata Guedet, n. var.

Packard described *piniata* in the genus *Parennomos* (New and Little Known Insects, Rept. Mass. Ag. page 247, 1870), but in his Monograph, page 238, 1876, he sinks this as a synonym of *Caripeta angustiorata* Walker. Strecker described his *seductaria* in the genus *Caripeta* (Lep. Rhop. Het. Suppl. II, page 9, 1899). It is a synonym of *piniata* Pack. Holland published a figure in his Moth Book, Pl. 44, fig. 2, which he called *Caripeta angustiorata* Walker. This was an error, as was pointed out by Taylor (Can. Ent. Vol. 36, p. 245). *Angustiorata* Walker is the species figured by Packard in his Monograph, Plate 9, figure 52. Holland's figure is a representation of *piniata* Pack. (*seductaria* Strecker) which is a good species, as noted by Taylor, l.c., and by Barnes and McDunnough (Cont. Lep. N.A., Vol. II, page 209, 1914).

In the typical form the primaries are "deep ochreous and paler at the base." Five specimens taken by Mr. J. A. Kusche, in the Chiricahua Mountains, Cochise County, Arizona, July, 1927, have much darker ochreous primaries; the strigations of the typical form are present; there is a distinct, whitish, evenly curved basal line; the antemedian area is the same shade as the median area, and the white line which, in the typical form, marks the boundary of the basal area, is barely indicated by two splashes of white in these specimens. The silvery, post-median line is radically different. In the typical form, "it curves inward just below the median vein, and again slightly opposite the discal spot." In these specimens this line is angled outwardly on the subcostal vein, running thence almost straight to the inner margin. Secondaries sparsely covered with darker irrorations, a trifle heavier outwardly; dark discal spots distinct. Smoky post-median line broad, broken and sinuate. Primaries beneath are much as in the typical form. Secondaries with a linear dark-brown discal spot; post-median line broad, heavy and dark brown but not reaching the inner margin. I propose for this variety the name *suffusata.*

Holotype, male, No. 4785, Rustler Park, Chiricahua Mountains, Cochise County, Arizona, 9000 feet, July 15, 1927; allotype, female, No. 4786, Fly's Peak, Chiricahua Mountains,

Cochise County, Arizona, 9-9800 feet, July 30, 1927. Paratypes, one male, Turkey Flat, Chiricahua Mountains, Cochise County, Arizona, 9000 feet, July 22, 1927, and one male and one female, Fly's Peak, Chiricahua Mountains, Cochise County, Arizona, 9-9800 feet, July 30, 1927, all in the collection of the California Academy of Sciences, San Francisco.

Semiothisa kuschea Guedet, n. sp.

Expands 33 mm. Palpi moderate, rough-scaled. Antennæ of both sexes simple. Head white. Thorax creamy white, scaled. Abdomen tufted at end, creamy white.

Primaries glistening, creamy white, crossed by four clay-brown bands; the first, 1 mm. wide, runs obliquely from the discal, sometimes with a slight curve, to the inner margin which it reaches about 2 mm. from the base; discal dot very minute, black; postmedian line about 1 mm. wide, running from the costa, about 2 mm. from the apex, with a slight in-curve to the inner margin three-fifths out from the base; subterminal line beginning slenderly at apex, widening rapidly to about 1 mm., then running almost straight to the inner margin near the anal angle. A thin but very distinct line of the ground color separates this line from the marginal line. Fringe creamy.

Secondaries of a lighter cream-color, with a small black discal dot and sometimes with traces of a subterminal line showing on the lower half of the wing. Fringe as on primaries.

Primaries beneath much as above; costa a bit more yellowish and the subcostal area slightly irrorate with brown from the base to beyond the discal line; lines of the upper surface distinctly reproduced; discal dot somewhat obscure. Secondaries much as above. The discal dot sharp, contrasting.

Holotype, male, No. 4787, Fly's Peak, Chiricahua Mountains, Cochise County, Arizona, July 18, 1927 (J. A. Kusche); allotype, female, No. 4788, Turkey Flat, Chiricahua Mountains, Cochise County, Arizona, 8-9000 feet, July 22, 1927 (J. A. Kusche). Paratypes, three males, Fly's Peak, July 18; Turkey Flat, July 22; Bar Foot Park, July 20; all in the Chiricahua Mountains, Cochise County, Arizona (J. A. Kusche, collector), and all in the collection of the California Academy of Sciences, San Francisco. Also two males, Fly's Peak, July 30, 1927, and July 29, 1927, Chiricahua Mountains, Cochise County, Arizona, in the collection of the author.

Superficially this appears to be a large *Euaspilates spinataria* Packard (Sixth Rep. Peab. Acad. Sci., page 45, 1874 and Geometrid Moths of N. A., page 204, 1876), but the male antennæ are simple, the dark lines of the primaries heavier, and, on close comparison, it proves to be altogether different. It is possible that this species is referred to by Strecker (Surv. Dept. Mo., Ruffner, 1878, Appendix, page 1863), where he speaks of two examples (of *spinataria* Pack.) both of which had "the dark lines of the primaries much heavier than represented in Packard's figure." It is difficult to believe that so good an entomologist as Strecker would have passed over the difference in the antennæ. I am convinced that the present species has nothing in common with *spinataria* Pack.

I propose for this species the name *kuschea* after the collector.

Vinemina perdita Guedet, n. sp.

Expands 37 mm. Palpi moderate, upturned, fuscous. Antennæ bipectinate in male with simple apex; pectinations long, arising from base of the segments, simple in the female. A large fovea at base of the primaries. Front fuscous clay color. Thorax gray, irrorate with black. Abdomen fuscous, ringed with white.

Primaries creamy white, heavily irrorate with black. Costa marked with eight spots which are the beginnings of as many irregular lines. First line very close to the base and sharply toothed outwardly in the subcostal area, disappearing before reaching the inner margin. Ante-median area with two almost equidistant subparallel lines, the second of which is heavier than the first and widens below the costa and at the inner margin; these cross the wing in three uneven scallops with the points directed inwardly. Median line heavy, crossing the wing in three scallops with the points directed outwardly. Space between the ante-median and the median lines less heavily irrorate with black in some specimens, giving this portion of the wing a slightly lighter appearance. Wing beyond the median line shaded with heavier irrorations which cloud the discal spot in some specimens. Post-median line composed of many small zigzag dashes; not parallel with the outer margin but approaching the median line on vein 1b, then sharply diverging to the inner margin. Subterminal line sinuate, composed of disconnected black spots. A dark shade opposite the discal area runs almost to the outer margin and is cut by a faint line of the ground color which fol-

lows the sinuate, subterminal line. Marginal line composed of triangular black spots on the veins. Fringe checkered white and brown.

Secondaries creamy white, evenly irrorate with brown, the discal spot brown. The only other maculation is a subterminal line of diffuse brown spots, parallel to the outer margin, and a marginal row of blackish spots more or less connected.

Primaries beneath suffused with dark brown, giving them the color of the secondaries above; maculation of the upper surface faintly reflected. Secondaries much as above.

Holotype, male, No. 4796, Fly's Peak, Chiricahua Mountains, Cochise County, Arizona, 8-9000 feet, July 30, 1927 (J. A. Kusche); allotype, female, No. 4797, Chiricahua Mountains, Cochise County, Arizona, 8500 feet, August 6, 1927 (J. A. Kusche). Paratypes, 10 males and 3 females, Bar Foot Park, Fly's Peak and Turkey Flat, all in the Chiricahua Mountains, Cochise County, Arizona, July 27 to August 2, 1927, in the collection of the California Academy of Sciences, San Francisco. Also two males and two females, Fly's Peak and Turkey Flat, July 3 to August 6, Chiricahua Mountains, Cochise County, Arizona, in author's collection, and two specimens sent from the same series three years ago to J. McDunnough and now in the Canadian National Museum at Ottawa, Canada.

I am indebted to Mr. J. McDunnough for the generic reference.

History of Beekeeping

History of American Beekeeping, by Frank C. Pellett, First edition. 213 pages, illustrated. 1938. Collegiate Press, Inc., Ames, Iowa. Cloth bound, $2.50.

In the pages of this book the author has traced in an interesting manner the important events in the early history of American beekeeping, from the time of the first importations of bees into this country until well into the present decade. The development of beekeeping in America has very closely paralleled the improvements, inventions of equipments and the perfection of their use in relation to bee behavior. The dates and men connected with these historical events are gathered together in a manner that will delight the student or teacher of the American system of beekeeping. Two chapters are devoted to American periodicals and books on beekeeping and another on beekeeping societies and conventions.—J. E. Eckert, Davis, Calif.

THE APHID GENUS KAKIMIA IN CALIFORNIA

BY W. W. SAMPSON
University of California

Genus KAKIMIA Hottes and Frison

Kakimia, Hottes and Frison, 1931, Ill. Nat. Hist. Surv. Bull., XIX:344 (*Subgenus*).

Kakimia, Gillette and Palmer, 1934, Ann. Ent. Soc. Am., XXVII:159.

Vertex convex with frontal tubercles small, hardly exceeding the vertex, aphis-like; antennæ with six segments, at least as long as body, with secondary sensoria subcircular and tuberculate; hairs usually capitate, and equal in length to diameter of the member bearing them; cornicles subvasiform to cylindrical; cauda medium sized, slightly constricted, sometimes tapering, aphis-like; lateral tubercles present; media twice-branched in the fore-wings; media and cubitus present in hind-wings.

Genotype *Myzus thomasi* Hottes and Frison.

KEY TO THE CALIFORNIA SPECIES

1. Cornicles dusky.....2
–. Cornicles pale.....4
2. No sensoria on third antennal segment of apteræ....*mimulicola*
–. Sensoria on third antennal segment of apteræ.....3
3. Unguis longer than third antennal segment.....*cynosbati*
–. Unguis shorter than third antennal segment.....*ribifolii*
4. Legs pale; abdomen of alatæ with irregular markings on dorsum .....*essigi*
–. Legs with at least tips dark; abdomen of alatæ with few markings on dorsum.....*castelleiæ*, n. sp.

Kakimia castelleiæ Sampson, new species

Alate viviparous female: Somewhat small, not robust, of yellowish green color; abdomen of uniform light green color, cornicles, cauda, and anal plate of lighter color; antennæ slightly dusky, tarsi and tip of tibiæ darker; antennæ longer than body, sparsely to moderately haired; combined length of thorax and abdomen equal to that of the tibiæ of the hind legs; tibiæ of all legs hairy toward the apices, rest of the leg-parts only slightly so. Abdominal tubercles present.

Average length of body: 1.87 mm.; width, .78 mm. Average lengths of antennal segments: I, .085 mm.; II, .064 mm.; III, .61 mm.; IV, .30 mm.; V, .29 mm.; VI, base, .1 mm., unguis, .71 mm., total, .81 mm. Length of cornicles: .16 mm.; of cauda, .19 mm.; of rostrum, .60 mm., reaching just to posterior edge of second pair of coxæ; from 27 to 36 secondary sensoria on third antennal segment, with an average of 30; on fourth antennal segment, 8 to

16, with an average of 10; on segment five, 0 to 2, with an average of one. Length of fore-wings: 2.7 mm.; of hind-wings, 1.5 mm.

Apterous viviparous female: More robust than alate form, body a light yellow green; top of abdomen sometimes with bands of light brown. Antennæ dusky from tips of fourth antennal segment outward. Cornicles duskier than in alate forms. Tarsi and tips of tibiæ dark. Rostrum reaches to middle of third pair of coxæ.

Length of body: 1.98 mm.; width, 1.00 mm. Average length of antennal segments: I, .085 mm.; II, .069 mm.; III, .50 mm.; IV, .22 mm.; V, .69 mm.; VI, base, .085 mm., unguis, .60 mm., total, .685 mm. Length of cornicles, .19 mm.; of cauda, .17 mm.; of rostrum, .50 mm. From 17 to 25 secondary sensoria on antennal III, with an average of 20; on antennal IV, 0 to 5, with an average of one; there are no sensoria on antennal V.

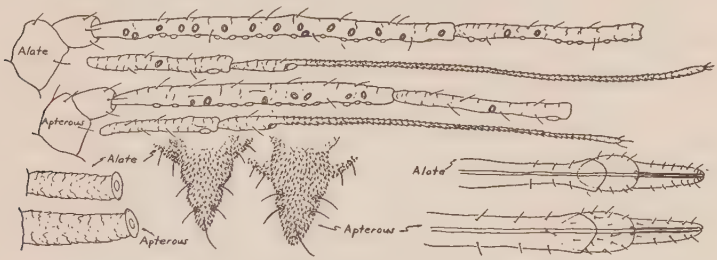


Fig. 1. *Kakimia castelleiæ* Sampson

There seems to be very little variation in size or color. In the antennæ of both forms the lengths closely approach the averages given above.

This species seems to be close to *K. thomasi* H. and F., differing in the lengths of the unguis in relation to the length of the third antennal segment, as well as in the number of sensoria on the segments; very few markings are present on the apterous forms of the new species, while there are many on those of *K. thomasi*; the host plants of the two differ also. It also comes near *K. cynosbati* (Oest.), the latter having the tips of the legs pale, and bands on the dorsum; there are no sensoria on antennal segments four and five.

This species is described from eight slides of specimens which were collected at Point Reyes Peninsula, Marin County, California, April 13, 1936, by Professor E. O. Essig, E. W. Baker, and the author, on *Castelleia neglecta.*

Holotype, collected by the author at the location cited, in the collection of the California Academy of Sciences (type No.

4616). Paratypes, collected by E. O. Essig, E. W. Baker, and the author, in the collections of these persons.

KAKIMIA CYNOSBATI (Oest.)

Oestland, 1887, Minn. Geol. and Nat. Hist. Surv., Bull. IV:81.
Swain, 1919, Univ. Calif. Pub. Ent. III:75.
Gillette and Palmer, 1934, Ann. Ent. Soc. Am., XXVII:162.

This species is seldom taken; the apparently last collection was by Paul S. Bartholomew, December 22, 1932, on the campus of Stanford University. As identified by Professor Essig, there was one alate and one apterous form.

KAKIMIA ESSIGI (Gillette and Palmer)

Essig, 1917, Univ. Calif. Pub. Ent., I:314, (*Myzus aquilegiæ*).
Swain, 1919, Univ. Calif. Pub. Ent., III:73, (*Myzus aquilegiæ*).
Gillette and Palmer, 1929, Ann. Ent. Soc. Am., XXII:30.
Gillette and Palmer, 1934, Ann. Ent. Soc. Am., XXVII:163.

This species is rather common throughout the state on *Aquilegia*, especially in the spring and summer.

KAKIMIA MIMULICOLA Drews and Sampson

Drews and Sampson, 1937, Pomona Journal Zool. and Ent., XXIX:29.

This aphid was first taken in Marin County. It has since been taken in Berkeley, California, by Essig (Oct. 4, 1937), and Sampson (Oct. 6, 1937); the latter also took it at Half Moon Bay (Jan. 16, 1938).

KAKIMIA RIBIFOLII (Dvdn.) (new combination)

Davidson, 1917, Journal Econ. Ent., X;294, (*Myzus*).
Swain, 1919, Univ. Calif. Pub. Ent., III:76, (*Myzus*).

Examination of this species, which was taken in fair numbers on *Ribes glutinosum*, on Strawberry Creek, University of California, during April and May of 1937, has convinced the writer that the species belongs in this genus rather than in *Myzus*.

KAKIMIA HOUGHTONENSIS (Troop)

Troop, 1906, Ent. News, XVII:59, (*Aphis*).
Swain, 1919, Univ. Calif. Pub. Ent., III:107, (*Aphis*).
Gillette and Palmer, 1934, Ann. Ent. Soc. Am., XXVII:164.

This species has never been found since the provisional identification by Davidson of an *Aphis* as this species. It was found on currant, and is mentioned here in hope that it will again be found and reported.

A NEW SUBGENUS OF NORTH AMERICAN SAPRINUS

(Coleoptera, Histeridæ)

BY EDWARD S. ROSS

University of California, Berkeley

This new division as defined below is proposed for a rather closely related group of species of *Saprinus* which differ abruptly from other members of the genus by characters deemed of sufficient importance to place the group in a more significant position than any of the group divisions of *Saprinus* adopted by Horn in 1873. Two of the species included in the new division, *opacus* Horn and *carinifer* Fall, have previously been assigned to groups of *Saprinus*, the former to group II and the latter to an intermediate position between groups I and II. Two additional species are herein described.

Eremosaprinus Ross, new subgenus

Very broadly oval, moderately convex, sides of pronotum and elytra continuously arcuate. Head with front unmargined, supraorbital striæ very feeble; vertex, clypeus, labrum and mandibles rugoso-punctate, clypeus shallowly impressed. Pronotum nearly twice as wide as long; sides strongly convergent, only feebly arcuate laterally, abruptly rounded at apical angles; frontal emargination broad, shallow; basal margins nearly straight, converging at scutellum in a sharply defined broad obtuse angle; surface punctate throughout, strongly longitudinally rugulose in lateral third. Elytra subevenly punctate throughout; disc striate, striæ finely carinate along outer edges, more strongly so basally; fourth dorsal stria arched at base and joining the sutural stria which may be obsolete basally in some species. Propygidium not prominent. Pygidium large, equilaterally triangulate, nearly flat in basal two-thirds, abruptly convex apically; evenly but not strongly punctate. Prosternum elevated, surface broad, nearly flat, moderately sloping forward, sides vertical; inner pair of striæ horizontal, sinuate, arcuately converging apically and in some species meeting; striæ definitely limit the flat face of the prosternum; outer pair of striæ on vertical sides obsolete. Protibiæ broad, thin; four- to seven-denticulate. Tarsal claws long and slender, feebly curved, subequal, fused in some species.

Type: *Saprinus (Eremosaprinus) unguiculatus* Ross, n. sp.

The species in this division have the general facies of certain members of *Saprinus* s. str., but aside from this superficial

resemblance bear no close relationship. In the form of the prosternum there is an approach to that found in the genus *Gnathoncus*, differing, however, in not being sharply narrowed anteriorly and in sloping forward rather than toward the mesosternum.

The subgenus consists of four species which form a very homogeneous group. These species are apparently confined to Lower California and the arid regions of Southern California and are very rare in collections.

Key to Species of Eremosaprinus

A. Surface smooth or only faintly alutaceous, shining; sutural striæ of elytra entire, strong.
  B. Inner subhumeral striæ of elytra obsolete, first dorsal striæ deeply impressed; prosternal striæ joining anteriorly ..... (1) *unguiculatus*
  BB. Inner subhumeral striæ of elytra present, entire, first dorsal striæ only moderately impressed; prosternal striæ interrupted anteriorly, tips terminating in small foveæ ..... (2) *falli*

AA. Surface strongly alutaceous, dull; sutural striæ of elytra obsolete basally.
  B. Prosternal striæ united apically..... (4) *opacus*
  BB. Prosternal striæ interrupted apically..... (3) *carinifer*

(1) Saprinus (Eremosaprinus) unguiculatus Ross, new species

Very broadly oval, convex, black, surface shining, partially and faintly alutaceous; legs dark rufous. Head finely rugose-punctate; front with a distinct shallow impression. Pronotum slightly less than twice as wide as long, sides converging, rounded slightly at base, more strongly so at apical angles; punctures fine, sparse medially, gradually becoming denser and more elongate laterally, finally longitudinally rugulose along sides; hypomera very finely and sparsely pubescent. Elytra one-third wider at basal fourth than sutural length; surface subevenly sparsely punctate, punctures almost obsolete outside of first dorsal striæ, denser at apical third; dorsal striæ raised, more strongly so basally, almost unimpressed except for the entire first dorsal which is deeply grooved; marginal stria fine, almost obsolete medially; external subhumeral short, basal, deeply impressed, present in basal third; internal subhumeral entirely obsolete; oblique humeral moderately impressed, present in basal third, subparallel to first dorsal; second dorsal somewhat shorter than first, hooked inward at base; third dorsal equal in length to second,

sharply arched at base and joining arch of fourth dorsal; fourth dorsal stria abbreviated half way toward apex, broadly arched at base and joining sutural stria which is entire. Pygidium alutaceous, median punctures sparse, indistinct, closer and more distinct laterally and apically. Prosternum with striæ only feebly sinuate, joined anteriorly in an abrupt arch. Protibiæ five- denticulate. Tarsal claws of all legs long, slender, subequal, fused, appearing as a single claw, three-fourths length of terminal tarsal segment. Length 3 mm., width 2.75 mm.

Holotype, female (No. 4777, Mus., Calif. Acad. Sci., Ent.) (Blaisdell Collection) and three female paratypes all from La Puerta, San Diego County, California, collected by Mr. G. H. Field. Two paratypes are deposited in the Museum of the San Diego Society of Natural History, San Diego, California, and one in the collection of the writer.

This species is peculiar in having its tarsal claws fused, whereas they are separate in the other known species of the subgenus. The complete absence of the inner humeral striæ of the elytra and the deeply grooved first dorsal striæ are additional features peculiar to this species. Very little variation is exhibited by the four specimens at hand.

(2) Saprinus (Eremosaprinus) falli Ross, new species

Very broadly oval, convex, color dark ferrugineous*, surface shining, not alutaceous. Head rugoso-punctate in front, punctures more distinct at vertex; front with a distinct shallow impression. Pronotum almost twice as wide at base as long, sides convergent, straight, evenly rounded apically, surface finely, sparsely punctate baso-medially, punctures becoming longer and more elongate medio-laterally, longitudinally rugulose at sides; hypomera finely, sparsely pubescent, hairs not visible from above. Elytra one-third wider at basal fourth than the sutural length, surface subevenly sparsely punctate, sparser at sides and denser in apical third; dorsal striæ very lightly impressed; marginal striæ fine, entire; outer subhumeral deep, short, basal; inner subhumeral fine, entire, abbreviated slightly at apex; oblique humeral distinct, extending one-third of elytral length, not joining first dorsal at base; first dorsal entire, moderately impressed; second and third subequal, terminating at apical fourth of elytra, strongly hooked inward at base, hook of third dorsal not quite joining arch of fourth dorsal; fourth dorsal slightly shorter than last two striæ, sharply sub-

*Light color probably due to immaturity.

angulately arched at base and uniting with the entire sutural stria. Pygidium moderately punctate, punctures somewhat finer and denser at sides and apex. Prosternum broad, short; striæ moderately sinuate, not uniting anteriorly but terminating in small but distinct widely separate foveæ; surface minutely sparsely punctate. Anterior tibiæ broad, thin, four-dentate. Tarsal claws long, slender, two-thirds length of terminal tarsal segment, not fused; outer claw three-fourths length of the inner. Length 3.25 mm., width 3 mm.

Holotype, male (No. 4778, Mus. Calif. Acad. Sci., Ent.) from Kings County, California, April, 1933.

The anterior foveæ of the prosternum are not present in the other species of the subgenus, the dorsal striæ of the elytra are also peculiar, being longer and more parallel than in any of the other species.

This interesting species is named for Dr. H. C. Fall, who has contributed much to the increase of our knowledge of North American Histeridæ.

(3) Saprinus (Eremosaprinus) carinifer Fall

Saprinus carinifer Fall, 1917, Can. Ent. 49:167.

The original description adequately describes this species. The following notes kindly made for me from the type specimen by Dr. Fall are desirable additions however:

Prosternum with striæ "sensibly less" widely separated at middle than at base; interrupted anteriorly but "without trace of small foveæ." "Tarsal claws slender, completely free and about two-thirds or three-fourths as long as the last tarsal joint."

This species was collected by Mr. G. H. Field, as was *unguiculatus*, in the mountains on the western border of the Colorado Desert in California, perhaps not far from La Puerta. In spite of their being from the same general locality, the two species are very distinct, *unguiculatus* being immediately separable by its shining surface, the absence of inner humeral striæ and by the long fused tarsal claws.

(4) Saprinus (Eremosaprinus) opacus Horn

Saprinus opacus Horn, 1894, Proc. Calif. Acad. Sci. (2) 4:364.

The following summary of characters of this species was made

by the writer from the type specimen in the museum of the California Academy of Sciences (Type No. 15).

Broadly oval; surface dull, finely, evenly alutaceous throughout. Discal area of pronotum finely, evenly punctate, punctures separated by interspaces three times width of punctures; lateral rugulose areas extending well up toward discal area, but decreasing in strength. Elytra strongly punctate, abruptly finer along suture within confines of fourth dorsal; outer marginal stria strong, entire; outer humeral stria oblique, joining outer marginal at base and extending apically one-fourth elytral length; inner humeral stria fine, subentire, abbreviated near apex; oblique humeral stria very faint, barely traceable by a weak impression; dorsal striæ not hooked inward basally; first three striæ carinate, first and second subequal in length extending nearly to apex, third shorter extending to apical fourth; fourth dorsal stria and sutural stria much finer than other dorsals, the fourth terminating slightly within apical half and arching basally, sutural stria obsolete in basal half. Pygidium strongly, closely, evenly punctate, punctures unevenly quadrate in shape. Prosternum somewhat depressed; striæ sinuous, meeting apically; anteriorly deeply unevenly impressed. Legs dark rufous; protibiæ seven-denticulate; tarsal claws long, slender, separate, three-fourths length of terminal tarsal segment. Length: 3.5 mm.

Described by Horn from a single example collected at San Jose del Cabo, Lower California.

The writer, who recently collected throughout Lower California, was unsuccessful in an attempt to secure additional specimens of this species while at San Jose del Cabo during July of 1938.

Carinifer and *opacus* are apparently very closely related, if not identical. The difference in the apical condition of the prosternal striæ, as indicated in the key and the descriptions, seems to be the most reliable point for separating the two.

The writer wishes to express thanks to Dr. H. C. Fall for his useful notes concerning the type of *carinifer*, to Mr. E. P. Van Duzee for granting permission to study the type of *opacus* deposited in the California Academy of Sciences, to Dr. F. E. Blaisdell for material loaned from his collection, and to Clinton G. Abbot and Ian Moore for a loan of three specimens of *unguiculatus* from the Field Collection in the Museum of the San Diego Society of Natural History.

PACIFIC COAST ENTOMOLOGICAL SOCIETY

H. M. ARMITAGE	E. G. LINSLEY	P. C. TING
Vice-President	*President*	*Secretary*

PROCEEDINGS

One Hundred and Forty-sixth Meeting, December 6, 1936.

Meeting held at 2:00 p. m. in the entomological laboratories of the California Academy of Sciences, San Francisco, California, with President C. D. Duncan in the chair. Members present: C. D. Duncan, R. L. Usinger, E. G. Linsley, L. W. Saylor, B. D. White, J. E. Elsea, M. A. Cazier, M. A. Embury, W. Hovanitz, W. M. Upholt, G. F. Ferris, J. B. Steinweden, J. R. Clark, E. R. Leach, C. D. Michener, P. DeBach, A. E. Michelbacher, D. DeLeon, J. L. Gressitt, J. C. von Bloeker, A. R. Mead, G. R. Struble, F. E. Blaisdell, J. O. Martin, E. C. Van Dyke, and E. P. Van Duzee. Visitors present: C. Atkins, Mrs. H. E. Peterson, Phyllis Brown, Ferne Haut, R. G. Pisano, W. Robinson, Elizabeth Turner, Dorothy Curry, R. C. Dickson, T. Aitken, D. D. Jensen, Pauline Schulthess, R. L. Kitchell, Miss I. Fraser, Miss D. Markwad, W. Lester, G. R. Ferguson, W. C. Reeves, D. P. Furman, and S. F. Light.

The Society unanimously elected to membership Dr. Florence M. Frost, Mr. George R. Ferguson, Mr. Dilworth D. Jensen, Mr. Deane P. Furman, Mr. Rocci G. Pisano, Miss Isabelle Fraser, Miss Ferne Haut, Miss Phyllis Brown, Mr. Will Lester, Jr., Mr. William C. Reeves, Mr. R. C. Dickson, Mr. Wilbert Robinson, and Mr. Clifford Atkins.

Mr. E. G. Linsley exhibited a box of *Andrena* and discussed some of the ecological and taxonomic problems involved in the study of this group of bees. He mentioned that nearly a thousand names had been applied to North American members of the genus but that many of the species had been very inadequately described. Their study is further complicated by great sexual dimorphism and difficulties in associating the sexes, many of which have been described as distinct species. Mr. Linsley estimated that at least five hundred species of *Andrena* occur in California, attributing the cause for such great speciation to the fact that most of the species are oligotropic and gather pollen from only a few, closely related species of plants.

Mr. Usinger commented upon some of the taxonomic problems involved in a study of the genus *Triatoma* and exhibited a box of significant species. He emphasized the fact that due to the importance of many of the species as vectors of trypanosomes, several of them had been originally described by medical men. Since the prime object of these men was to make available a name that could be utilized in medical literature, the species were rarely adequately described and often unrecognizable from the descriptions.

Mr. Upholt presented some data on the distribution of Mayflies and pointed out that many of our California species occur throughout a much greater area than has generally been believed.

Dr. Duncan then presented Dr. S. F. Light of the Department of Zoology, University of California, who addressed the Society on the origin of the termite caste and the mechanism of caste determination. Dr. Light's data, mostly gained from a study of the ontogeny of a termite colony, will be published elsewhere.

After a general discussion of Dr. Light's paper the meeting was adjourned.—E. G. LINSLEY, Secretary.

One Hundred and Forty-Seventh Meeting, March 6, 1937.

Meeting held at 2:00 p. m. in the entomological laboratories of the California Academy of Sciences, San Francisco, California. Members present: C. D. Duncan, E. G. Linsley, E. C. Van Dyke, E. P. Van Duzee, J. R. Clark, R. C. Dickson, M. A. Embury, A. R. Mead, C. D. Michener, I. Frazer, C. H. Atkins, P. Brown, F. Haut, W. H. Lange, Jr., W. M. Upholt, J. O. Martin, A. E. Michelbacher, G. E. Bohart, R. M. Bohart, P. C. Ting, J. B. Steinweden, G. F. Ferris, G. R. Wilson, D. D. Jensen, L. W. Saylor, W. C. Reeves, W. P. Furman, G. R. Ferguson, P. DeBach, J. L. Gressitt, G. R. Struble, D. DeLeon, F. E. Blaisdell, A. T. McClay, H. E. Burke, W. Hovanitz. Visitors present: E. B. Babcock, P. H. Timberlake, S. F. Light, P. S. Lange, G. Prole, O. Hartman, W. F. Boyer, R. E. Hackley, R. P. Allen, G. S. Hensill, G. Vargas, G. Kaloostian, and H. C. Donohoe.

The following were unanimously elected to membership in the Society: Dr. S. F. Light, Mr. P. H. Timberlake, Mr. Bryce Boyer, Mr. Glenn Vargas, Mr. R. E. Hackley, and Mr. George Prole.

Dr. Blaisdell exhibited a number of drawings of melyrid and tenebrionid beetles and stated that the lateral tergal processes of tenebrionid pupæ offer good characters for the separation of genera.

Dr. Duncan then announced that the subject for discussion for the afternoon program was "The Species Concept," and introduced the first speaker, Dr. E. B. Babcock of the Department of Genetics, University of California. Dr. Babcock affirmed that species actually exist in nature and pointed out that a species could be defined on the basis of the following five points: (1) *resemblances* between individuals composing the species (these resemblances being morphological, physiological, ecological, cytological, etc.); (2) *similar heredity* (their nuclei carry the same genes); (3) *constancy* of characters within certain ranges (involving stability); (4) *common descent* (evolutionary aspect); and (5) *syngamy* (or complete fertility and free intercrossing of individuals). To these five points Dr. Babcock added two additional ones: (1) Absence of free intercrossing with other species and

low fertility or sterility in hybrid progeny, and (2) formation of intra-specific groups (subspecies, races, etc.). Dr. Babcock also emphasized that an important practical aspect of the species question was "recognition" and that this could be based on morphological features, physiological features, geographical distribution, cytology, etc., and pointed out that a study of hybrids assisted greatly in the study of species.

Dr. Babcock was followed by Dr. Ferris. He remarked that to some few men a species was merely a name on a pin. To the points raised by Dr. Babcock, Dr. Ferris added the importance of morphology in the stability of species, since many genetically compatible forms may be prevented from crossing due to discrepancies in the structure of their sexual organs. He likewise pointed out that crossing may be prevented by physiological or psychological incompatibility. Dr. Ferris defined species as populations of a continuous interlinking complex.

After a general discussion of the subject by the members of the Society, the meeting was adjourned.—E. G. LINSLEY, Secretary.

One Hundred and Forty-eighth Meeting, April 17, 1937.

Annual field meeting, held at 10:00 a. m. in Golden Gate Park, San Francisco, California. Members present: E. P. Van Duzee, G. F. Prole, Will Lester, Jr., J. Reitzel, R. L. Usinger, G. F. Ferris, and H. E. Burke. One-half of the group devoted its time to studying scale insects in the park, the other half to collecting in the sand dune area near the ocean.—R. L. USINGER, Secretary *pro tem.*

One Hundred and Forty-ninth Meeting, September 11, 1937.

Meeting held at 2:00 p. m. in the entomological laboratories of the California Academy of Sciences, San Francisco, California. Members present: C. D. Duncan, E. G. Linsley, W. H. Lange, Jr., J. O. Martin, J. L. Gressitt, C. D. Michener, G. E. Bohart, E. O. Essig, A. E. Michelbacher, H. E. Burke, R. E Hackley, R. L. Usinger, S. F. Bailey, M. A. Stewart, A. R. Mead, E. C. Van Dyke, R. G. Pisano, M. A. Embury, B. E. White, E. L. Kessell, P. DeBach, W. M. Upholt, R. C. Dickson, E. S. Ross, W. C. Reeves, G. F. Ferris, and E. P. Van Duzee. Visitors present: Mrs. W. H. Lange, Jr., Mrs. F. Parker, N. W. Frazier, B. R. Bartlett, J. J. DuBois, A. D. Cameron, K. Hagen, W. Barr, J. A. Downes, T. Aitken, K. L. Maehler, B. G. Gisla, and W. V. Pelle.

The Society unanimously elected to membership the following: Mr. Kenneth L. Maehler, Mr. J. J. DuBois, Mr. Benedict G. Gisla, Mr. Walter V. Pelle, Mr. B. R. Bartlett, and Mr. Alan D. Cameron.

The nominating committee (Dr. Michelbacher, Mr. Van Duzee, and Dr. Van Dyke, chairman) recommended that the present offi-

cers be retained for the coming year. The Society voted accordingly and re-elected Dr. C. D. Duncan, president; Mr. R. L. Usinger, vice-president, and Mr. E. G. Linsley, secretary.

Mr. Usinger exhibited an interesting bat parasite of the family Polyctenidæ (Hemiptera). The specimen represented the second U. S. capture of a member of this exceedingly rare group of insects.

Mr. Linsley exhibited stylopized females of *Andrena porteræ* Cockerell, one of which showed a partial reversal of secondary sex characters. This specimen was of special interest because it presented characters of a male *Andrena* which had been described as a distinct species (*leptanthi* Vier. and Ckll.), but had been recently suspected of being the male of *A. porteræ*.

Mr. Linsley also exhibited a member of the scarab genus *Pleocoma* which had been collected in Seward, Alaska, by the late Mr. J. A. Kusche. This example extends the known range of this wingless group by more than one thousand miles.

Mr. Van Duzee announced the purchase by the Academy of the Fenyes collection of Coleoptera. He reported that the collection was rich in exotic material, particularly from Mexico. The portion of the collection devoted to Aleocharinae is composed of more than 1800 species.

Dr. Duncan exhibited photographs of the embryo of *Smerinthus*, and of a termite colony. The last was remarkable in showing reciprocal feeding, grooming, various castes, eating of dead, feeding on wood, immature soldiers, etc., in a single photograph. Dr. Duncan also discussed the Death Valley Nature School conducted by San Jose State College during the summer. He said that observations suggested that in a small pool about 75 feet in diameter on the floor of Death Valley, there were at least half a million insects. Similar observations on a tumbling stream in the San Jacinto Mountains, resulted in estimates of twenty-three million aquatic insects to a mile of stream.

Dr. Duncan then introduced Prof. Essig, who had just returned from abroad, and who spoke upon some observations on European entomology. Prof. Essig first went to Cambridge, which served as his headquarters for much of his visit. He described his participation in an ecological survey of Wicken Fen, where he was much interested in the wide variety of equipment carried by collectors. During his stay in England, Prof. Essig attended meetings of the Linnean Society, the Royal Entomological Society, and the Zoological Society of London. Prof. Essig discussed the work of the various British and continental universities, and closed his talk with a word of appreciation for the fine spirit of cooperation and friendliness which was shown to him by entomologists everywhere that he had traveled.—E. G. LINSLEY, Secretary.

One Hundred and Fiftieth Meeting, December 4, 1937.

Meeting held at 2:00 p. m. in the entomological laboratories of the California Academy of Sciences, San Francisco, California. Members present: C. D. Duncan, E. G. Linsley, E. C. Van Dyke, J. O. Martin, G. F. Ferris, A. E. Michelbacher, E. O. Essig, F. E. Blaisdell, A. R. Mead, R. L. Usinger, R. E. Hackley, H. E. Burke, E. P. Van Duzee, R. C. Dickson, W. Lester, E. R. Leach, M. A. Cazier, and Mr. and Mrs. C. T. Atkins. Visitors present: L. A. Brubaker, D. Hackley, K. Sinclair, R. K. Goodline, T. Aitken, H. J. Rainwater, J. A. Downes, J. R. Douglas, M. F. Blair, J. W. Tilden, B. E. Rees, M. J. Vogel, G. Mansfield, K. D. Snyder, J. S. Yuill, J. E. Patterson, R. B. Foley, and P. Brown.

The following were unanimously elected to membership in the Society: Mr. Thomas G. Aitken, Mr. J. A. Downes, Mr. Karl D. Snyder, Mr. Millard F. Blair, and Mr. Marcel J. Vogel.

Mr. Usinger reported that the Historical Committee had published a statement in the PAN-PACIFIC ENTOMOLOGIST concerning the purpose and activities in connection with the accumulation and preservation of materials of historical interest to entomology.

Prof. Essig announced that vacancies in the Publication Committee required a reorganization of the group. He proposed that a business manager be added to the permanent staff of the journal and that in addition to the editor, associate editor, treasurer, and business manager, the committee be composed of nine rotating members, each to serve for a period of three years with freedom of re-election. The reorganized committee proposed by Prof. Essig, including the present membership, was as follows:

E. P. Van Duzee, editor; E. C. Van Dyke, associate editor; E. R. Leach, treasurer; R. L. Usinger, business manager. Rotating members: F. E. Blaisdell, G. F. Ferris, and E. O. Essig, to serve through 1938, E. G. Linsley, F. X. Williams, and S. F. Bailey, to serve through 1939, and C. D. Duncan, J. A. Comstock, and H. H. Keifer, to serve through 1940. The report was accepted by the Society and the new members unanimously elected.

Dr. Duncan then introduced the speaker of the day, Mr. Lester A. Brubaker, of San Jose State College, who spoke upon the subject of insect photography. Mr. Brubaker spoke of his early interest in pictorial photography and its gradual change to an interest in the photography of insects. He discussed various methods which he had developed for special problems encountered in this field. Of special interest was a frame and mirror attachment to the camera which throws light directly on the insect, and the use of water cells for photographing aquatics. Mr. Brubaker showed numerous lantern slides of insects in various habitats, including a particularly fine series of the mourning cloak butterfly.

Following a discussion of Mr. Brubaker's remarks, the meeting was adjourned.—E. G. LINSLEY, Secretary.